For Users of Zenith Computers

SEXTANT®

Issue No. 31 November-December 1987 $3.50

Smooth Sailing With a '240

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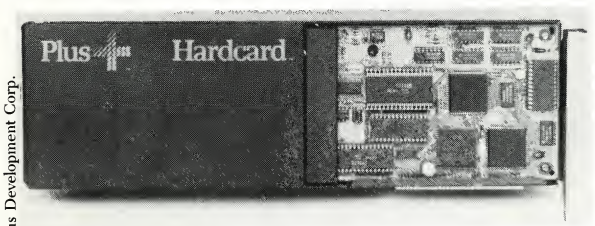
SEXTANT



Plus Development Corp.

9 It's easy to add a hard disk to a Z150. Just plug this circuit card into an empty expansion slot. The software installation, though, requires knowing a trick or two.

Photo by Charles Floto

24 They're calling it the Last National HUGCON. Some people think we should do it again sometime. Do you?

Features

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12 Before you leave on that world cruise, it might be worth adding a Z240 to your sailboat. The computer can be a source of income as well as an aid to navigation.

Departments

Cover photo by David W. Zimmerly

The Editorial Eye

If a computer system can do only one thing at a time, that one thing had better be *significant*.

But if a computer system can manage several contemporaneous programs, we can afford to devote some of its processing power to relatively simple tasks. The multi-tasking operating system makes *little* programs respectable again. (A dozen years ago, little programs were the only kind you could write if your computer had only 256 bytes of memory.) One nice thing about little programs is that they can be written by individuals. Most "significant" software is written by teams of programmers.

Zenith Data Systems has announced it will be shipping a multi-tasking operating system by the end of 1987. Microsoft Corp.'s Operating System/2 (OS/2) will run on a Z248, Z386, or the new Z286—or any other Zenith computer with an 80286 or 80386 microprocessor. (You need a hard disk, at least 1.5 megabytes of RAM, and EGA or better video.) ZDS notes it signed up for OS/2 before any other manufacturer of machines compatible with the IBM Personal Computer. In particular, it beat Compaq Computer Corp. (IBM no longer makes any 80286 machines compatible with the IBM PC.)

In further support of the individual programmer, who may have a tight budget for hardware, Heath Company announced in August that there will be a kit version of the Z386. The H386 was introduced to Heath/Zenith Users' Group members at a price of $3,349 during HUGCON. (For more on this gathering at the Hyatt Regency O'Hare, see page 24.)

Heath/Zenith users are in a good position to pioneer some little programs for OS/2. But why wait for a new operating system? We have an article in this issue about David Clark's little program that fits into a corner of the Z150's memory that MS-DOS doesn't mess with. (See page 58.)

In the months between the announcement of OS/2 and its release, Microsoft's new operating system picked up a reputation of being suitable primarily for sophisticated users. It's too soon to tell whether this reputation will be confirmed once OS/2 is widely available.

Zenith Data Systems does have something to offer Z386 users who prefer to stick with MS-DOS 3: Microsoft's Windows/386 operating environment. This will allow the simultaneous use of several programs written for MS-DOS. Windows/386 runs under MS-DOS 3 to share system resources among the programs in use. In particular, Windows/386 allows each program to have its own display window within the computer screen.

ZDS will continue to bundle version 1 of Microsoft Windows with each of its computers having a hard disk and either an 80286 or 8088 microprocessor. On page 52 of this issue, a Z100 user describes this initial implementation of Windows. The article should provide a good preview of what we can expect from Windows/386. (The most obvious difference is that Windows/386 will allow display windows to overlap, while Windows 1 butts them together like tiles.)

Sextant first looked at Windows in our May-June 1984 issue. We have further coverage of Windows in the works for 1988. Windows promises to link up the Z100 to a supply of software aimed at the much larger marketplace in which ZDS's current computers find themselves.

A *physical* link between Z100s and Zenith's IBM compatibles is described in this issue's "Z100 Notebook" (page 16).

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Letters

Update on the '248

In the process of adding a couple of expansion boards to my Z248 computer, I noticed two errors I made in writing my review of the machine ("The Z248: One User's Impressions" in *Sextant* #30, September-October 1987).

First, I observed that there are *two* of the Zenith-designed 128-pin connectors—rather than *one*, as I said in the article—that are not used.

Second, I incorrectly noted the speed of the RAM chips on the CPU card as being 120-nanosecond devices. The chips installed are soldered to the board, and are 100 ns. A call to the Heath technical-support line revealed that memory chips must be 125 ns or faster to work in the Z248. That means that 120s will probably work, but you are coming pretty close to that limit. A marginal chip will most likely cause trouble.

I don't know exactly how I failed to notice a slot, or how I misread the RAM chips. I regret any inconvenience that this may have caused.

Incidentally, I have been searching for an alternative to the Zenith memory-expansion boards for the '248. The BocaRAM AT (from Boca Research, Inc., 6401 Congress Ave., Boca Raton, FL 33431; 305/997-6227) provides a way to fill out the extra 128K of conventional memory, as well as giving you either expanded or extended memory of up to 2 MB (4 MB with the addition of a daughterboard). The best news of all is that with the proper RAM chips, it will work fine with the high-speed Z248.

Kirt Alan Winter
Corvallis, OR

The missing code

Thought I would let you know that I really enjoyed the May-June 1987 issue of *Sextant*. The article on setting Epson printer functions ["Set Epson Printer Functions on the '100 or '150," by Richard L. Mueller, *Sextant* #28] was particularly interesting because I have been looking for a program to do just that. The fact that it was for MS-DOS as well as for CP/M, especially CP/M-86, was really appreciated, since I have a Z100 and use both operating systems.

I ran into a few problems with the CP/M-86 version of the program and discovered some code had been left out. (See Listings A and B.)

Please keep up the good work and continue your excellent coverage of the '100 and CP/M. I, for one, am still on the lookout for CP/M programs to run on my system.

Mike Wolfson
Ashland, OH

The '171: plus and minus

I have used a Zenith '171 computer as my only computer since the fall of 1985. I had been using an H89, which I was quite happy with, but as I travelled a lot, I needed something I could take with me. A computer has now become indispensable to me as a tool for writing generally, and particularly for storing and retrieving both observational data and bibliographic references that I use in my research and publications. Of the portables available at the time I had to buy one, this was clearly the best; and I have had no major

```
        CMP     AL,'I'
        JZ      INIT            ;if initialize printer requested

        CMP     AL,'B'
        JZ      CBUF            ;clear printer buffer

        CMP     AL,'S'
        MOV     BX,OFFSET SETM  ;preset for "set" request
        JZ      P4              ;if "set" requested

        CMP     AL,'C'
        MOV     BX,OFFSET CLRM
        JZ      P4              ;if "clear"
```

Listing A. See "The missing code," below, left. The shaded portions of the code above are to be inserted in the CP/M-86 version of SPF given in Richard L. Mueller's article in *Sextant* #28. They should be inserted between the last lines shown on page 74 and the first lines shown on page 75 of that issue.

```
LCTRC   EQU     OFFSET $-SCTRC
MENMSG  DB      CC_ESC,'E'      ;Clear screen
        DB      'SPF - SET PRINTER (EPSON) CONTROL FUNCTIONS...'
        DB      CC_LF,CC_CR
        DB      'Copyright (C) 1984 Richard L. Mueller, Ph.D.'
        DB      CC_LF,CC_CR,CC_LF
        DB      'Print Modes:'
        DB      CC_LF,CC_CR
        DB      '  SC / CC   -   Set / Clear Condensed Printing'
        DB      CC_LF,CC_CR
        DB      '  SX / CX   -   Set / Clear Enlarged Printing'
        DB      CC_LF,CC_CR
        DB      '  SM / CM   -   Set / Clear Emphasized Printing'
        DB      CC_LF,CC_CR
        DB      '  SP / CP   -   Set / Clear Proportional Printing'
        DB      CC_LF,CC_CR
        DB      '  SD / CD   -   Set / Clear Double Strike Printing'
        DB      CC_LF,CC_CR
        DB      '  SE / CE   -   Set Elite Chars / Clear = Set Pica'
        DB      ' Chars'
        DB      CC_LF,CC_CR,CC_LF
        DB      'Paper Functions:'
        DB      CC_LF,CC_CR
        DB      '  SS / CS   -   Set / Clear Skip over Paper '
        DB      'Perforations'
        DB      CC_LF,CC_CR
        DB      '  S8 / C8   -   Set 8 LPI / Clear = 6 LPI'
        DB      CC_LF,CC_CR
        DB      '  SL / CL   -   Set Left Margin Over 2 Columns / '
        DB      'Clear = Reset Left Margin'
        DB      CC_LF,CC_CR,CC_LF
        DB      'MISC. Functions:',CC_LF,CC_CR
        DB      '  B         -   Clear Printer Buffer'
        DB      CC_LF,CC_CR
        DB      '  E         -   Eject Paper - New Page',CC_LF,CC_CR
        DB      '  I         -   Initialize Printer'
        DB      CC_LF,CC_CR
        DB      '  Q         -   Quit - Return to CP/M-86'
        DB      CC_CR,'$'
IREQ    DB      CC_ESC,'Y',(31+24),(31+1),CC_ESC,'1 ??  $'
ILLREQ  DB      CC_ESC,'Y',(31+24),(31+8)
        DB      '  Illegal Request...Try Again....$'
CLEAR   DB      CC_ESC,'E$'
        END
```

Listing B. See "The missing code," left. The labels shown shaded are to be inserted at the left of the appropriate lines given on page 77 of *Sextant* #28. The rest of each line remains unchanged.

problems using it as my only computer. I would like to make a few brief comments, however, with regard to Wayne Rash, Jr.'s article in your May-June 1987 issue ["'150 Compatibility, To Go," *Sextant* #28]. By and large his assessment is fair, but people might be interested in another writer's view of the machine.

Though I do not have the "supertwist" screen, I find the display adequate most of the time. The drawback is that it is almost impossible for two people to look at it at the same time; their angles of viewing are different, and hence, a good adjustment for one viewer is often quite bad for the other. A possible plus for this sort of screen might be that it lacks the health hazards to which people are exposed by long hours in front of CRTs. (I don't know if this is a fact, however.)

For me, the keyboard's smallness is not a problem. Its feel is as good as the best I have tried. But the programs I use the most (XyWrite and FYI-3000) require frequent use of the function keys (F1, etc.), and their placement on this machine is a decided disadvantage. They are too far away from the main keyboard.

The primary disappointment of this computer, and a major one too, is that its autonomy on battery is so short. Rash says he gets three hours of useful activity per charge, but I am lucky if I get even two hours. And the "battery low" warning tends to go on too late to permit me to save my data! The only time the machine accidentally erased a whole disk was when I tried to save a text and the battery power was insufficient (without prior warning) to do the job. Thus one of my main hopes for the machine is quite disappointed. I had hoped to be able to take it into libraries, meetings, and even African villages where I could use it for taking notes away from power sources.

On the other hand, it is possible to adjust the power supply box for current of either 110 or 220 volts AC, though to do so requires opening the box and a somewhat delicate maneuver inside it. I had to make this change so that I could use the computer in France and elsewhere in Europe, but could have received a shock and/or damaged the power supply if I hadn't done it properly. (The manual says "This setting should only be changed by a qualified service technician.")

Paul Riesman
Paris, France

We can't be sure, but perhaps the battery problem is related to the peculiarities of nicad charging patterns. Readers who have problems in this area might want to look at Don Carter's article, "The Z181: Portability Without Compromise," in Sextant *#29, July-August 1987.*

Checking out IBM software on the '100

I write this short letter simply to thank both you and Robert S. Logan for the article "Taming the Wild Interrupt" in the July-August 1987 issue of *Sextant*. Two things in particular impressed me about the article:

1. There were no errors in the program listing for TAME.ASM.
2. The program worked perfectly for me on all of the IBM software that I tried.

Robert E. Heath
Sault Ste. Marie, Ontario

File privacy

With reference to Joseph Katz's elaborate efforts to illustrate privacy for the files on a disk in MS-DOS ("C Notes," *Sextant* #30, September-October 1987), MS-DOS already has the utilities to accomplish that task with style and subtlety.

FLAGS.COM will set the attributes of a file to Hidden, or you can use Pat Swayne's ATTRIB.COM (published in *REMark*, vol. 5, issue 12, December 1984, pages 40-42), which does the same thing.

You can hide all of the files on a disk by just typing FLAGS *.*, but you can't use them without resetting the attributes.

You can hide a file and have use of it by setting the attribute to System. I use FLAGS FLAGS.COM S as a way to hide the attribute-setting utility on a disk; sometimes I even change its name to something else. Then I can type FLAGS *.* and—Presto!—all of the hidden files appear.

Pat Swayne's program is particularly good because if you just type ATTRIB you will get a list of the command structure.

There are a number of four-letter words that one can use to hide the ATTRIB.COM while it is hidden with the system attribute. I prefer LOVE.

Should you get trapped, you can always use HADES (the Heath Absolute Disk Editor) to see all of the files and what attribute is set. If you have HADES, it is like being in heaven when you have a disk directory problem in MS-DOS 2. It even allows you to reset the attributes.

Robert W. Rasch
Johnson City, TN

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Plug a Hard Disk on a Card into Your '150

It's the easiest way to add a hard disk to a '151 or '158—if you know a few things they left out of the documentation.

JoAnne Benedict

There comes a time in the life of any computer when you need to add a hard disk. I built my dual-floppy Heath '151 two years ago—and soon began to use so many floppy disks that I couldn't keep track of them all.

I didn't want to sacrifice a floppy drive for a Winchester, and my desk was too small for an external hard disk. I needed a hard disk on a card.

After considering several brands, I decided on the Plus 20-megabyte Hardcard. (The suggested retail price is $795, although I've seen it as low as $650.)

Of the brands I considered, the Hardcard was the only one that would fit in a single slot; it had a fast access time (49 milliseconds) and low power consumption (8 watts). It wasn't just a conventional hard disk mounted on a circuit board. Both the disk drive and the disk controller circuitry were designed specifically for the purpose.

Also, it runs quietly, and has an average lifespan of 40,000 hours. When the power is turned off, the head automatically parks and locks in a safe landing zone.

However, I had heard that my '151 might need a new read-only memory (ROM) chip to boot from the hard disk. So, I called Plus Development to make sure the Hardcard would work in a Heath/Zenith '151. Yes, I was assured, my computer was on the approved list. The '151 would be able to boot the Microsoft Disk Operating System (MS-DOS) from the Hardcard without any modifications—but I would probably have to do a "manual install."

That sounded like a nuisance, but I was sure the software or documentation would walk me through the procedure. Without asking what a "manual install" was, I promptly ordered a Hardcard.

Formerly an IBM programmer, JoAnne Benedict is now a professional writer. Her articles have appeared in Byte, MicroComputing, *and* Business Age.

Easy installation

When my Hardcard arrived, the directions were very clear on physically installing it in the computer. I simply removed the cover, carefully fitted the Hardcard into an empty slot, and placed the cover back on.

Everything seemed to work fine. I had a perfectly good hard disk—but it wasn't bootable.

If you already have an internal hard disk in your computer, the Hardcard can be configured as the second hard disk, drive D:, by changing the position of a jumper on the Hardcard.

A snag

The hard disk came already formatted for MS-DOS and contained the Plus Development support software. There was no mention of a manual installation procedure in the documentation; so, I simply followed the directions that were there. I put an MS-DOS system disk into drive A: and a blank diskette (used to back up the programs on the Hardcard) into drive B:. Then I typed in C:INSTALL C, and waited for some message to tell me how to do a manual install.

The installation batch file copied the hard-disk files to the backup diskette in B:, and wiped the hard disk clean of files. During the installation process, the batch file also looked for an IBM-specific file. Not finding it, the batch file aborted and ended with the message, "The Hardcard in your system has not been installed."

It then told me to follow the instructions in my Hardcard reference manual and run Hardcard's automatic installation procedure. The only problem was that I *had* followed the instructions. There was no information on doing a manual install, either in the reference manual or on the disk.

For the next two hours, I tried various commands with the Hardcard. I created a couple of subdirectories using MS-DOS's standard MKDIR command. I copied a few files to those directories. I also set up the Hardcard's menu utility, HCD.

Everything seemed to work fine. I had a perfectly good hard disk—but it wasn't bootable. How should I transfer the operating system to it? I could have used MS-DOS's standard FORMAT/S, but, fortunately, I took the time to further check the Hardcard manual instead.

The "manual install"

After about two hours of reading the documentation and playing with the system, the light finally dawned. If I had had a stock IBM Personal Computer, the installation would have been totally automatic. It would have erased the Hardcard files and backed them up on a floppy. Then it would have looked for my operating-system disk, and reformatted the hard disk to make it bootable. It would also have set up a number of subdirectories. (The automatic installation creates directories named SUB1, SUB2, etc.) And it would have transferred my operating-system utilities to the root directory.

Well, on my '151, the automatic installation had gone as far as cleaning the hard disk and backing up the files it removed. I had to do the rest, which was mainly a

matter of copying files.

To do the job of MS-DOS's FORMAT utility, the Hardcard package gives you the HFORMAT utility. The manual warns you not to use FORMAT because it will reduce the Hardcard's performance. Using HFORMAT allows a higher interleave factor and an extra sector per track.

So, I used HFORMAT to put the MS-DOS system on the hard disk. Then I copied my MS-DOS utilities to the root directory. My next step was to create the subdirectories I wanted, and copy whatever files I wished to each directory. As a final step, I set up the HCD menu utility for the applications I wanted.

It wasn't hard to do a manual install, but why couldn't Plus Development document the procedure in the manual!

Afterward, I found out that Plus Development *does* have instructions for installing the Hardcard on a '150 or a '158. But you have to know to ask the company to send them.

It works well

My Hardcard has worked very well. I found only two bad sectors, and wrote two dummy files onto those sectors. (Unfortunately, the Hardcard doesn't seem to include any utility to lock out such sectors.)

It wasn't hard to do the manual installation, but why wasn't the procedure documented?

To tell you when the disk is being accessed, the Hardcard displays a plus sign in the upper right-hand corner of the screen. Some programs, however, may take over the entire screen, leaving you with no way to tell that the hard disk is being accessed. So, the support software includes a utility to let you change the plus sign to sound; then there'll be a faint beep when the hard disk is in use.

My '151 is set for autoboot; when I turn it on, it looks first for a disk in the A: drive, but after 18 seconds, I see the plus sign on the screen and it boots from the Hardcard.

Aside from the small omission in the documentation concerning the manual install, I am pleased with the Hardcard.

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Smooth Sailing With a '240

A Z241 aboard a 35-foot sailboat assists with the navigation and financing of a world cruise of indefinite length.

David W. Zimmerly

Many people, especially males nearing middle age, dream of sailing away into the sunset. I was no exception, and, in my downtown Ottawa driveway, reacted to my own mid-life crisis by building a 33-foot wooden sailboat with Chinese junk sails. In 1982 and '83, my wife Helga and I sailed *Arluk* to the Bahamas and back by way of the Inland Waterway.

Before we sailed, I had quit my job as Arctic Anthropologist for the National Museums of Canada. When we returned to Ottawa, the microcomputer revolution was just picking up steam. It looked exciting, I needed to earn a living, and I wanted in.

For several weeks, I researched all available microcomputers and finally settled on a Z100. For one year I immersed myself in dBASE II, WordStar, Multiplan, FORTRAN, BASIC, C, games, communications programs—you name it, and I tried it. We had active Heath Users' Group meetings in Ottawa, and I never missed one.

I was not entirely new to computers. During the early 1960s, I was a mainframe scientific programmer/analyst for Sylvania and IBM. As an anthropologist in the late 1960s and '70s, I continued to use computers to process research data. In 1984, the time was ripe to set myself up as a consultant.

Several small jobs worked into a bigger one. The result was a one-year contract to develop a data base management system (DBMS) for a government collection of Inuit prints and sculptures. (Inuit is the proper name for the Eskimos.) It was a dream contract—I was able to do everything, from designing the system to writing the user manual.

When Helga and I returned from our Bahamas trip, we decided that within five years we would buy or build a larger, world-class sailboat and leave for a world cruise of indefinite length. A boat that matched all our requirements came on the market less than a year after our return to Ottawa. We bit the bullet, remortgaged the house, and bought the boat.

Now it was all starting to come together. We were both working, but could live off Helga's income alone. My income enabled us to outfit the boat and save money for a cruising kitty. But neither one of us is independently wealthy. We needed some means to replenish our funds as we cruised.

No longer is it necessary to carry many heavy books of navigational data.

Helga is an art historian, and has secondary-school teaching credentials and a number of published articles to her credit. I, too, have some published articles, mostly about Eskimos and kayaks; but more important, I thought that my computer skills were portable. It was at this point that I dreamed of having a floating computer-consulting business.

During this year of preparing to sail, we upgraded our computer hardware. Helga purchased her own Macintosh Plus, and I got a Z241 AT compatible. The thought of trying to write without our favorite word processors was more than we could bear; so, both computers would have to go with us.

Finally, in June 1986, we sold our house in Ottawa, left our jobs, friends, and relatives, and boarded our 35-foot sailboat *Erasmus*. Our destination was Cape Dorset, a small Canadian Eskimo community on Baffin Island, Northwest Territories. (See Figure 1.)

Boat configuration

Erasmus is a Kingston 35. She is all-aluminum, with a pilothouse and full keel. The keel extends 5 feet below the surface of the water. Three sails—a main, jib, and stay-sail—give us a speed of 5 to 7 knots. We also have a Volvo Penta MD11C—a two-cylinder, marine diesel engine, whose 24 horsepower can move us along in a calm at 6 knots.

We carry enough fuel to motor 700 miles. Water is carried in two 45-gallon tanks. We cook with propane, heat with a diesel furnace, and light the boat and run electronics with two 12-volt, deep-cycle batteries. (Sometimes called a "golf-cart" battery, this type can take a deep discharge without being damaged.) For finding our way, we have radar (with a range of 12 miles), plus satellite navigation, VHF radio, and two sextants.

In a pinch we can sleep six, but prefer no more than four.

Computer configuration

My Z241 has 640 kilobytes of memory, a 360K floppy, a 1.2-megabyte floppy, a 40-MB Seagate ST4051 hard disk, a Microsoft Mouse, a US Robotics 300/1200-baud internal modem, 1 MB of extended memory (the Z405 board), an 80287 numeric co-processor, and a Genoa Spectrum video board. The monitor is a Zenith amber ZVM-1240. I print on an Epson FX-85, and plot on a Roland DXY-880.

The space reserved for the Z241 is only 30″ wide. The computer itself is bolted vertically to a bulkhead. (See Photos 1 and 2.) The printer is on a stand that holds paper inside. Printer and stand are strapped down on the table with the keyboard in front.

On the front of the table, a raised lip (called a fiddle in nautical terminology) prevents the keyboard from sliding off when the boat heels. The monitor on a swivel stand has its own shelf. It, too, is bolted down to prevent any movement.

For the Macintosh, Helga has to make

David W. Zimmerly is a computer consultant in the fields of Arctic anthropology, artifact appraisals, and museum collections management.

Figure 1. The author's trip took him and his wife from Ottawa, out the St. Lawrence River, and around the coast of Labrador. Their destination was Cape Dorset, a town of about 900 people, on Baffin Island, in Canada's Northwest Territories. (Satellite map projection generated using software and data provided as part of the Micro World Data Bank II files. The view is from a height of 202 nautical miles over a point at 60° north latitude and 75° west longitude.)

do with a padded case stored under the navigation table.

Energy configuration

Supplying power to run all this equipment was a major problem. When we are at a dock, it is no problem to have 110 volts run into the boat; but at anchor, this is not possible. There is also a problem in remote places where good, clean power is not available. Another question was what to do in countries where the local power is 220 volts and 50 hertz.

Our solution was to always run the computer from the ship's batteries. That way, any local surges, either from land or from our own diesel, would be smoothed out. We connected the computer to a 1,000-watt, Tripp Lite PV-1000FC, frequency-controlled, DC-AC inverter. The inverter is connected to the ship's deep-cycle batteries, which provide a total storage capacity of around 200 amp-hours.

We have four different methods of keeping power in the batteries:

1. When the engine is running, it turns a 55-amp alternator that charges the batteries.
2. A wind generator on a pole on the stern is connected to the batteries. On days with average winds of 18 knots, it can generate about 100 amp-hours per day.
3. When we plug in at a dock offering 110 or 220 volts, we use a Ray Jefferson Model 3030 30-amp battery charger that will accept either 110 or 220 volts input.
4. Finally, for use in a remote anchorage with no wind and no dock power, we have a Honda EX 650 generator. It is relatively quiet, and produces power clean enough to plug in the computer directly.

An unfortunate incident, however, persuaded me to use the generator only to supply power to the battery charger. One afternoon, I was powering the computer directly from the generator. Nearing completion of a rather lengthy writing project, I was about to save what I had done in the last half-hour, when the Honda generator (four hours per two-liter fill) suddenly ran out of gas, and I lost all my data.

Although there is much energy lost in converting from the 110 volts of the Honda to the 12 volts in the battery, back to 110 in the inverter and then back to DC in the computer, this method seems to be the safest way to prevent data losses.

Boat-related computer uses

Our on-board computer capability is greater than that of any yacht that raced in the America's Cup in Australia. What do we do with all that computer power and storage capacity?

There are two major uses: boat-related computing, and lifestyle-support computing.

Many of our boat-related computer uses are still under development as we refine our needs for world cruising. The boat applications require the use of a DBMS and a sophisticated word processor. We use dBASE III Plus for our DBMS, and Clipper to produce compiled versions of our dBASE routines. For word processing, we have progressed from WordStar to Microsoft Word to XyWrite III.

When cruising, we need to solve a number of piloting and navigational problems. These may include computing times of sunrise and sunset, having reliable tide predictions, and computing distance from one point to another, given latitude and longitude.

We also need to calculate what compass course to steer when there are cross currents. And, to determine literally where in the world we are, we have to reduce our sextant sightings to longitude and latitude and points on a map.

No longer is it necessary to carry many heavy books of navigational data. These tables can easily be computed as needed on the Z241. Even the nautical almanac is now available on a floppy disk from the U.S. Naval Observatory in Washington, D.C. A program recently advertised in *Cruising World* magazine computes tide tables for the entire east and west coasts of the U.S., plus Alaska.

dBASE III is sophisticated enough to handle even heavy-duty trigonometric calculations. And with the addition of the Clipper compiler, its programs are no longer so agonizingly slow.

I also use the newly released UI Programmer, which generates terrific dBASE screens; pop-up menus; and pop-up, context-sensitive help boxes, as well as basic file-maintenance programs. The combination is an excellent systems developer's environment.

The integrated dBASE III-based Boat Cruising package that we are developing for ourselves includes files that can generate a crew list, a spares list, an equipment list, a chart list, recipes, a bibliography, a suppliers list, and a mailing list.

The package will also handle all our piloting and navigational needs, integrating tide tables and nautical almanac information.

For our word processing needs, one of the nice features of XyWrite III is that it has a built-in command language; it is possible to write files of these commands to do any number of jobs. In effect, you are writing a program. With some word processing programs, this is called a "macro command file" or a "file macro."

Last summer, our major boat-related use of the Z241 was for keeping a daily log. (Figure 2 shows a typical log entry.)

Photo courtesy of the author

Photo 1. The computer center onboard *Erasmus* measures just 30″ wide by 35″ deep. It is located amidships, across from the owners' berth. The Z241 is bolted upright on the bulkhead at the right; the mouse and printer are on the shelf above. The top shelf holds the ZVM-1240 monitor.

Photo 2. Helga at the Z241.

Photo courtesy of the author

Using XyWrite III allowed us to automatically write the blank log headings and then read in the previous day's entries for latitude and longitude of destination, odometer-log reading, and fuel-hour meter reading. (Yesterday's "End" reading is today's "Start" reading.) The computer made log-keeping fun, and I looked forward to the end of each day, when I could switch on the computer and write my entry.

One of our initial worries about having the computer on board was that it would be attacked by salt-air corrosion and quit functioning within no time.

That was not the case—maybe for two reasons. One is that running the computer every day probably generated enough internal heat to dry out any components that might have accumulated moisture.

The other reason is that it was often cold enough at night to run our Espar D3L hot-air diesel heater, which circulated dry, warm air throughout the boat. No computer or mildew problems ever occurred.

Despite our success using the computer for navigation and record-keeping, however, we also maintain more traditional equipment and skills. A wise sailor always has backup capabilities for any critical system on board.

Lifestyle-support computer uses

We arrived in Cape Dorset on September 13th. Our cruise took us 2,900 miles from Ottawa, out the St. Lawrence River, up the coast of Labrador, and across Hudson Strait to Baffin Island.

Helga and I were both tired from travelling continuously for 80 days, and we relished the idea of sitting still while at anchor in Cape Dorset Harbor. Since we were not using the diesel engine, I switched to the Honda generator to supply our electrical needs.

During the voyage to Cape Dorset, I had neither the time, nor the energy, nor the electrical power for much computing. But now I was ready to work on all the development projects I dreamed of during those long hours at the wheel. While I sat on the boat computing, Helga went ashore and looked for a job.

By the end of the first week, Helga had landed a full-time position with the government of the Northwest Territories, teaching problem eighth-grade students. With the job came a house with unlimited heat and electricity, as well as twice-weekly deliveries of 500 liters of water and daily pickup of the "honey bucket."

In early October, we had *Erasmus* dragged up onto the beach and set upright for the winter. The boat was brought close to shore at high tide. (There's a 25-foot tide.) At low tide, the boat was laid on its side atop a tractor tire on a sheet of steel; it was then dragged up the beach past the high-water mark using two front-end loaders. Two more front-end

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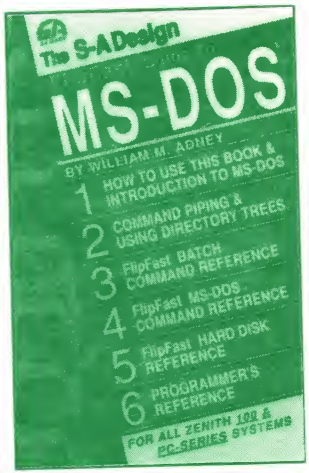

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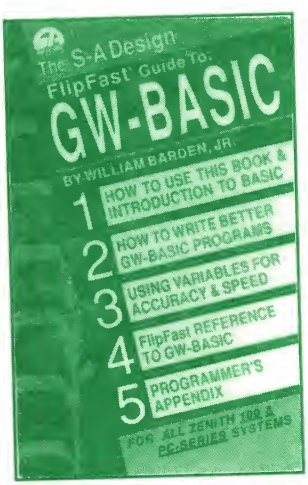

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- ★ **Hints, tips, and bugs** that can save you hours of programming time
- ★ **Error messages** listed and explained for every command, where applicable

You get all this ***plus*** the following:

- ★ How to use GW-BASIC
- ★ Tips on using variables
- ★ Complete reference appendix

If you use GW-BASIC, fill out and return this card today to order your copy!

loaders set the boat upright, and sections of telephone poles were wedged under the hull to keep it upright. A nine-dog Eskimo team kept nearby provided security for the boat.

Now it was time for me to find a way to earn some income.

I started by writing magazine articles. But with milk at $3.95 a liter and bread at $2.75 a loaf, article writing becomes supplementary income only. Although Cape Dorset has a population of only 900, a number of opportunities for computer work were present.

First, I was awarded a contract to do some maintenance and enhancements to the system I had completed in Ottawa the year before. I bought Microstuf's REMOTE communications program, and had it installed on the computer in Ottawa. Now, using Procomm on the Z241, I am able to call Ottawa via satellite and operate the system as though I were sitting at the keyboard there.

What makes REMOTE different from most communications packages is its ability to let me run even many "ill-behaved" programs (ones that circumvent the operating system and write to the screen directly through hardware). On command, REMOTE will take a snapshot of the screen and send it out the serial port. Even at 1200 baud, this makes for slow screen painting. But it does work!

Next, I landed a contract to teach the town's recreation director how to do monthly and yearly budgeting using Lotus 1-2-3. On the Macintosh, we designed and printed raffle tickets for a snowmobile, both in Eskimo syllabics and in English.

This led to other people in town becoming interested in computers. I signed up with Arctic College, based in Frobisher Bay, to teach an Introduction to Computers course. Twenty-two students immediately signed up.

Some of the students were from the West Baffin Eskimo Cooperative, known worldwide as the major source of fine Eskimo sculptures and prints. They were in the market to computerize their business, and they saw that the cost of the computer and my consulting could be amortized in just one year.

I contracted with them to install an AT-compatible system, to design and develop a dBASE III turnkey system, and to train their staff to use and maintain it.

To add some variety to my consulting work, I also taught grades 6, 7, 8, and 10 as a substitute, took an occasional day shift as guard in the local Mounted Police lockup, and acted as local agent and maintenance person for TeleSat Canada, the folks who bring us radio, TV, and phone service.

Basic fees for consulting vary from $25 to $50 per hour. However, it can be expensive to keep up-to-date. For example, when I want to access my favorite special-interest groups (DBFSIG, ATSIG, and the Clipper SIG) on The Source, I pay long-distance charges to Montreal ($0.22 to $0.66 per minute), plus Source and SIG charges.

Now, if only I could find time to complete development of my cruising package. . . .

30 August 1986 Saturday

From: Clark Harbour, Labrador	L 60° 14.3' N, Lo 64° 23.0' W
To: Killinek, N.W.T.	L 60° 25.2' N, Lo 64° 51.0' W
TIME - Departure:	1110
TIME - Arrival:	1430
TIME - Daily Hours:	3.33
LOG Reading - Start:	2375.07
LOG Reading - End:	2393.93
LOG - Daily Run:	18.86
FUEL Hour Meter - Start:	386.3
FUEL Hour Meter - End:	393.0
FUEL - Daily Hours:	6.7
AVERAGE SPEED:	5.7

NARRATIVE: Last night was simply awful. We were both scared that we might drag and I stayed up until after 0300 on anchor watch. The wind shifted slightly towards the south from west and we started getting swells that made us roll like pigs. It was probably the most uncomfortable night we have ever spent at anchor on ERASMUS. About 0300 some stars came out and the moon appeared. All the time the barometer was moving

Figure 2. A typical daily log entry for the sailboat *Erasmus*. The XyWrite III word processing program automatically enters all headings and some numerical entries; the author wrote a small file of XyWrite commands to perform this task.

When the ice melts

Helga and I are now so firmly entrenched in the personal-computer revolution that there is no going back to life BC (before computers). We are wondering how we will finance the next generation of personal computers, but to every such problem there is always a solution.

Our next project is to equip *Erasmus* with a high-frequency, single-sideband (SSB) marine radio and automatic tuner (Icom M-700 and AT-120), connected to a packet-radio controller (such as the Heath HD-4040 Terminal Node Controller or the Advanced Electronic PK-232 Multimode Data Controller).

This setup will give us access to packet-radio networks, and we will also be able to decode weather, news, and other transmissions in Morse, Baudot, and ASCII code. The data can then be written to the computer's auxiliary storage for later printing or reading. We will also have weather-fax capability, so that weather charts can be dumped to our Epson printer.

It's now June here in Cape Dorset; after the ice departs Hudson Strait this July, we will again set sail for distant ports. We'll have our trusty computers on board, as well as our cat Lukassie, 100 pounds of rice, several cases of Japanese noodles, and enough cans of chili peppers to have our favorite Chile Rellenos at least once a week while we head for the canals of France via Greenland, Scotland, England. . . .

Additional Information

Procomm, shareware, $10 for trial copy; $50 with manual.
DataStorm Technologies, Inc.
P.O. Box 1471
Columbia, MO 65205
314/449-7012; BBS: 314/449-9401

dBASE III Plus, model #AT-5063-5, $695.
HD-4040 Terminal Node Controller, $199.95.
H/Z241, no longer available.
H/Z248, assembled, $3,699; kit, $2,249.
Heath Company
Benton Harbor, MI 49022
Orders: 800/253-0570; in Michigan and Alaska, 616/982-3411

Micro World Data Bank II, $10.
Micro Doc
3108 Jackson Streeet
Bellevue, NE 68005
402/291-0795 7 to 10 p.m. Central time

Clipper, $695.
Nantucket Corporation
12555 W. Jefferson Boulevard
Los Angeles, CA 90066
213/390-7923

XyWrite III, $395; demo disk, $7.
XyQuest, Inc.
3 Loomis Street
Bedford, MA 01730
617/275-4439 △

Z100 Notebook

William N. Locke

As I write this, summer is well installed. The Chesapeake Bay thunderstorms are once again proving their rule over the evening—making computing a challenge after working hours. At the first sign of lightning, no matter what I'm working on, I shut down all computers and turn to reading books.

I suppose one could argue that a good mix of thunderstorm and nonthunderstorm nights provides readers with a richer "Z100 Notebook." I will have had more time to read the manuals and to find out what's going on.

I once talked with somebody who claimed to have had a computer fried by a lightning strike. I don't wish to doubt the story. However, I have a cheap and certain lightning filter. Rather than costing several hundred dollars, as so many of them do, mine is free.

I unplug the computer when it's not in use.

This issue in the "Z100 Notebook," I'll look at some important products for the Z100.

Networking with the KAL1000 and ViaNet

We've all been hearing about local area networks (LANs) for some time now. I think most folks would have this to say about networking: You need to have a lot of money; you have to have a lot of technical experience; and networks are useful only in businesses where communication between offices is hindered because people don't want to carry a piece of paper down the hall.

Well, I recently had the opportunity to play with a network system, and my experience wasn't like that at all.

A small network is not particularly expensive for a small business or the like. I plugged the whole thing together without having one bit of training. And the usefulness of the system is by no means limited to computer mail.

The network I put together consisted of just two Z100s, so I was able to see how it might work in a small office. In this section, I hope I can give you some of the confidence that would allow you to put together a LAN without shelling out thousands of dollars for consulting.

How much money?

I obtained my KAL1000 LAN system from SoftNet Communications of Great Neck, New York. This network is fully capable of connecting Z100s and IBM compatibles in a system of independent nodes. The boards involved cost $445 for the Z100, and $395 for the IBM compatibles. (For large numbers of boards, the per-copy cost is less.) Those prices include the software required to make the LAN work. To get the price of the total system of networking computers, simply add this amount to the price of each computer.

The KAL1000 system can connect as many as 255 computers. (I like the Z100, but that may be a few more than my family would abide.)

How much experience?

The folks at SoftNet asked me to call them as soon as I ran into trouble. But, as I indicated above, no real understanding of LANs is required to put this network together. The instructions were adequate, and I had the system up and running in about 20 minutes.

The Z100 version of the network hardware is an S100 board that plugs into any of the slots in the machine. A connector needs to be installed in the J17 position in the rear of the Z100, and a small wire runs to a plug on the KAL1000 network board.

For nodes (machines) that will not be at the end of the network, a plug-type jumper on the board is removed; these nodes are connected to T-connector junctions along the cable.

Finally, a node number is selected by a set of eight switches, also on the S100 board.

The computers in the network can be hooked together using BNC connectors and as much as 1,200 feet of standard RG-58/U coaxial cable. The documentation states that a maximum separation distance of 4,000 feet can be achieved using RG-8 cable. (I used RG-58/U cable, and the separation was only about five feet. My shop is not a quarter of a mile long.)

The IBM-compatible version of the network hardware is similar to that for the '100, except that it plugs into a standard IBM-PC expansion slot, and the BNC cable connector attaches directly to the board. I prefer the chassis mounting on the Z100. If somebody were to yank one of the cables, I would rather not have the resulting force placed directly on the computer cards.

SoftNet has done a particularly good job of making it easy to install the software for the net. The company provides an installation program and a new CONFIG.SYS file for the boot disk (or the boot partition on a hard disk).

The installation program states that the networking system assumes that your computers will be running at 5 mega-

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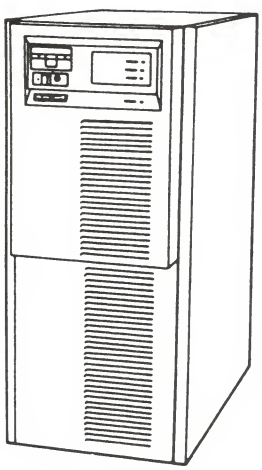
The ultimate micro-to-mainframe link

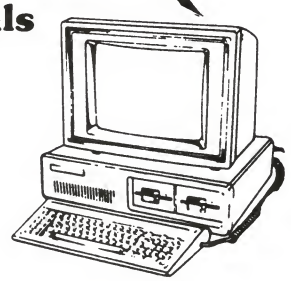
PC77/78 — Emulates the Honeywell VIP7700/VIP7800 series of synchronous terminals



Features:
• color attribute mapping • hot key to DOS • access host via multiple windows • print redirection • script processing • help facility • print spooling

File Transfer:
• menu driven • macro capability to bypass menus • data compression • file identification security features • attended and unattended mode of operation • restart capability • help facility

PC73/78 — Emulates the Honeywell VIP7200/VIP7300/ VIP7800 series of asynchronous terminals



Features:
• color attribute mapping • hot key to DOS • print redirection • script processing • help facility • print spooling

File Transfer:
• Kermit • Xmodem • ASCII • menu driven • macro capability to bypass menus • attended and unattended mode of operation

The personal computer can be connected to any Honeywell host via a modem, modem-bypass or multiple interface unit (MIU) and may reside on a communications line with other PC's or terminals. No host system or application software modification, regardless of the operating system is required.

High-performance communications software from:

Cambridge Computer Corporation
203/288-6004, Telex 6502236599

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Circle #197 on Reader Service Card

hertz; but you can also install it for 8-MHz operation. The network has been tested by SoftNet in IBM clones running at up to 12 MHz.

The supplied CONFIG.SYS file contains a statement

DEVICE = NETSYS\NETDRVR.SYS

to install the device driver for the network, getting the driver from the NETSYS subdirectory.

The next level of software, KA_DRVR.EXE, is run during installation. This program provides the interface with the ViaNet software described below. To configure the software to the machine (Z100, IBM-PC compatible, or PC-AT compatible), you can specify several parameters on the command line that invokes KA_DRVR. The installation batch file provided by SoftNet provides appropriate values for each type of machine.

The answer to the question, "How much experience?" is none. I was barely aware of what a local area network could do when I was plugging in the boards and following the SoftNet instructions. But no smoke came out of my computers, and the system worked.

What do I do with a network?

I have two Z100s. One has a hard drive and a floppy disk; the other has two floppy disks. Each machine has 768K of memory. With a local area network system, each computer has three floppy drives, one hard disk, and two RAM drives of whatever size I choose (up to about 500K).

For most applications, I have been using the computer with the hard drive as the main computer; the other sits off to the side as the auxiliary machine. I particularly enjoy using the auxiliary machine for working on an article on the hard disk at the same time the hard-drive machine is compiling a long program.

In short, a local area network using the ViaNet software "combines" two or more computers. Each computer is fully capable of acting as a stand-alone machine. All disk drives, printers, and other devices on the net are available to all computers.

An important difference exists between this system and a file-server-type network. In the latter, one computer is singled out as the central system, and the other terminals are subservient to it. With ViaNet, all computers are equal.

I would recommend a local area network for any organization needing many terminals to do a job. If several people need to update a single large data base of names of people in an organization, for instance, or if a group of terminals are required to look at automobile parts data, for example, or if many people are doing word processing, then a LAN will do the job. This is the modern answer to yesterday's central, many-terminal, mainframe computer system.

The ViaNet network software (from ViaNetix, Inc., of Boulder, Colorado) is the real strength of this system. It manages each computer's assets to do several things at what would appear to be the same time. In reality, each Z100 or IBM-PC clone on the net has only one 8088 running at 5, 8, or 4.77 MHz. That means that the software needs to handle scheduling and switching between events that are demanded on the one hand by the program running in the local computer, and on the other by instructions that arrive via the network hardware.

This is an example of multi-programming on a small scale, but similar to what one would find in a large, multi-tasking, multi-user, mainframe computer system.

Using the ViaNet system

When installed, the ViaNet software consumes over 100K of memory; so a Z100 with 768K or an IBM clone with 640K of memory is recommended.

With the net software installed, the computer appears to have a new drive, drive Z:. A directory of this drive, however, will contain no files or subdirectories, but rather a list of all the active nodes (machines) on the network. These nodes may be listed as Node01, Node02, Node03, etc. Or they may be given names by the users, such as Bill, Jeanne, Records, etc.

These nodes are treated as if they were subdirectories on drive Z:. But just as a directory of drive Z: does not produce a list of files, neither does a directory of a node. Instead, it produces a list of the active devices available at the node.

Say, for example, that a network contains a node, Node01, with two floppy drives, a console, and a printer. The directory of that node would be: A, B, CON, and PRN.

The change-directory command, CD, may be used to move down to the node level, allowing the user to do a directory of any of the individual drives in a node. After you enter CD, it's simply DIR A: or DIR B:. Here, the A: and B: drives are treated as subdirectories of Node01.

With a few Z100s, '150s, or '240s, the KAL1000 network system will likely do fine.

This entire structure is an extension of the Microsoft Disk Operating System (MS-DOS), which makes the network easy to learn if the user is familiar with the operating system.

The ViaNet software has provision for extensive password security for both net access and file access. It is possible not only to limit the individual users on the net, but also to vary the degree of protection given to a node or a file. For example, all the files at a given node may be made "Read Only" by declaring the node to be a "Read Only" node. Or individual files might be made "No Access" except on presentation of a password.

The software allows you to assign single-letter logical names for the paths from a local machine to drives on other machines. So, drive A: on Node01 could be accessed as drive G: from Node01.

On my two-computer network, for example, I set up the local floppy drives as A: and B:, the hard-drive partitions as E: through H:, and the RAM drive as I:. Drive J: is assigned to the remote's RAM drive (path Z:\NODE02\I). I address the remote machine's floppy drives A: and B: as C: and D: (paths Z:\NODE02\A and Z:\NODE02\B). (If my machine had an 8″

Alternatives to a Local Area Network

Networks facilitate sharing resources among computers and users. But, depending on the resource you want to share, there may be an alternative method less expensive than a local area network.

Suppose you want to share an expensive laser printer. One option is to attach it to a network. Another is to attach it to a single computer with a floppy disk drive. Then, whoever has something to print walks over to that computer carrying a floppy disk with the file to be printed. This alternative is sometimes known as Walknet or Sneakernet.

Perhaps you're considering sharing a Winchester disk between two computers. Add up the costs of the network's components. Then compare that with the cost of buying a hard disk for the computer that lacks one. Remember that an additional Winchester would increase the total storage available, while a network would just divide up existing storage between two users.

Maybe what you want to share is information. If the data won't fit on a single floppy, or if it changes more frequently than you care to walk disks around, then perhaps you should consider a network. Just remember that network software introduces its own complications, and involves an additional expenditure. *Charles Floto*

drive installed as drive C:, I would need to use a different letter.)

The ViaNet software documentation is divided into two sections. One, the User's Guide, is intended for all those folks on the network who are expected to use it but who may not have the highest level of access to the system. For instance, these people will not have the ability to add new members to a data base.

The other section, the Network Administrator's Guide, provides information for an individual designated a "Super User." When logged on, a Super User may perform those functions associated with administering the net—such as adding new members, making a node a location that will contain the password file, or giving a node the capability to download the ViaNet software at bootup if that node has no disk drives.

All in all

If you are thinking about coming up with a multi-terminal system, you do not need to pay a large consulting fee, and you do not need to pay for a large "turnkey" system. With a few Z100s, '150s, or '240s, this system will likely do fine.

The ViaNet documentation includes several forms and instructions for planning the most efficient use of your network. I recommend studying this guide before you set up your hard-disk partitions and distribute your printers and hard drives.

In several cases, major software packages such as Enable have special versions designed for working across networks. (See last issue's "Z100 Notebook" for a closer look at Enable; *Sextant* #30, September-October 1987.) In each case, prior to investing, you should contact the software company and ask them if your current version will work on a network.

HyperAccess: a communications workhorse

HyperAccess is from Hilgraeve, Inc. It's a powerful communications package, available both for the Z100 and for IBM-compatible computers. It costs $149, and runs under MS-DOS.

Its ancestor, Access, was the first strong Z100 modem program I recall. HyperAccess incorporates many of the features of that earlier product, but also includes a number of new ideas. Matt Gray, the author, apparently has a great deal of communications experience; the experience is well used here.

HyperAccess can use a variety of modems, including the US Robotics internal Z100 modem. It can also use a variety of external modems, including those that operate at 2400 baud. Computer-to-computer communications through a cable can be as fast as 19,200 baud on the Z100 (up to 57,600 baud on the IBM compatibles).

Basic communicating

I found that I could be up and communicating with a dial-up computer network within about fifteen minutes of opening the HyperAccess box. The program comes with a superb, clearly written manual. And for the user willing to proceed fearlessly into the unknown, the program can be learned by exploring the menus. You need only to tell the program your desired speed and which communications port you'll be using.

When you first run HyperAccess, you are given a master menu of six options: place a call; answer a call; send and receive files; use MS-DOS commands from within HyperAccess; set up the program; and quit and return to MS-DOS.

Also, you can go directly to the communications screen by hitting F0.

The menu options summarize the overall functions of HyperAccess. The communications screen is a blank screen, used for most actual conversational interaction between your computer and a remote system.

Placing a call

When you use HyperAccess to place a call, a submenu is presented that contains the phone numbers you have set up. If you have a suitable modem, HyperAccess can automatically call up and give selected log-on sequences to as many as 127 remote systems. You can configure this menu with any choice of numbers to be called and log-on codes for each number. The program comes with preset log-on entries for several common commercial networks, including CompuServe, MCI Mail, EasyLink, NewsNet, and The Source.

Answering a call

The "Answer a Call" option supports linking two computers through a cable, as well as using your computer with a modem capable of answering the phone. With this option, HyperAccess permits an individual at a remote terminal to gain access to your computer. When dealing with remote users, the program offers three levels of protection.

At the first level, remote users can transfer files from their computers to yours, and can download files from your computer. Also, messages can be left for you or the other users to read. In this first mode, though, remote users cannot alter files on your machine.

A less-protected level allows a remote user full access to operate your computer. This allows running programs on your computer from another computer. As an example, remote users could write programs on their computers, transfer the programs to your computer, compile them there using your compiler, and transfer the results back to their own computers for execution. So long as the program being run from the remote loca-

tion does not circumvent MS-DOS to write directly to video memory, it will appear on the remote terminal just as it would on yours. This mode offers no protection for your files other than the good will of the authorized user.

The final level available to the remote user is "Program Access." This allows the remote user to use just one program on your computer. You specify the program; it can be a .COM, .EXE, or batch file. When the program exits, HyperAccess will disconnect the caller.

This level allows tight control over remote access to your computer. You might use this level for a program that would dump a specific file of information to the remote user, or you might allow the remote to make a specific data entry to a data base that's resident on your computer.

Terminal emulation

HyperAccess can be used to communicate with large computer systems. This is achieved by causing the Z100 or IBM compatible to respond to the remote system as if it were a terminal of a standard type expected by the system. The options for terminal emulation are: DEC VT-52, VT-100, and VT-102; Televideo 925 and 950; IBM 3101 and 3278; Wang; H19; and TTY.

I have never used a computer terminal that I prefer to the Z100. I think one could argue that the designers of the Z100 produced the ideal keyboard. HyperAccess's emulation features allow use of the Z100 in place of expensive but less comfortable terminals.

File transfer

HyperAccess allows the transfer of files from one computer to another using any of the following file-transfer modes:

Text—No error checking. Quick, but it may lose characters.

XMODEM—Transfers files in blocks, and checks for errors in each block using both cyclic-redundancy checking (CRC) and checksum error checking.

Kermit—Transfers files using the Columbia University format. This format also uses extensive error checking.

The IBM-compatible version of HyperAccess supports file compression on the fly; it also has a very fast file-transfer protocol, proprietary to Hilgraeve.

Scripts

Aside from its easy-to-learn user interface, possibly the strongest feature of HyperAccess is HyperPilot, a communications language designed by Hilgraeve.

Programming using HyperPilot is intended for the advanced user who wishes to automate the system, to allow others to use it, or to allow repetitive tasks to be done easily. The pre-programmed tasks can range from simply obtaining messages from a network in the middle of the night to administering a dial-back security system. In the latter case, the remote user could be required to provide a password and then hang up, waiting for your computer to call back. This would ensure that the remote was at an authorized phone number.

The computer can be set up to do tasks that involve comparing input with expected results; it will be able to respond by performing any action that HyperAccess is capable of performing. Branching, string construction, and pattern matching using wildcards are supported.

Copies and copyright protection

I tested HyperAccess using a modem, and also using a cable connecting two Z100s. The first time I used a cable, I found that Hilgraeve had installed an interesting feature to protect its copyright. The software checks to see that the serial numbers of the two copies of HyperAccess are, in fact, different. If they are not, a message pleasantly recommending that you get another copy of the program is displayed, and the communication is terminated.

The second HyperAccess copy needed for computer-to-computer cable communications costs only $30, but the point is well made. I was embarrassed that I had been caught in a license-agreement violation. The second copy is offered only

to nonbusiness end users who are the sole owners of both machines.

A special version of HyperAccess is available for use with the UCI EasyPC board in IBM-compatible mode using the Z100's communications ports. This version is needed only if you do not have the UCI communications board that supplements the EasyPC.

It's all you need

HyperAccess is probably the most powerful communications program available for the Z100. It should be considered by any organization that needs to perform complex communications tasks among Z100s or IBM-compatible computers.

If all you want to do is converse with a public network (such as those mentioned above), a less powerful communications package would probably do. But for the complicated tasks that HyperAccess lets you perform, I know of no other package that would come close to this.

Matt Gray has told me that he does not expect to come out with any further versions of HyperAccess for the Z100, but no matter. The version that he has out now is superb. The current IBM-compatible version is probably the leader in the field.

UCI's EasyWIN

UCI Corporation is still supporting the Z100. Here, I'll review two rather new UCI products: a hard-disk system and a superb memory board.

The hard-disk system is called EasyWIN, and it's easy to install and operate. The 21-megabyte drive costs $632; it's a Seagate ST 225 half-height drive that mounts in either the A: or B: disk-drive space. (A 31-MB drive is available for $727.)

The EasyWIN system uses a Western Digital, IBM-compatible, hard-disk controller, which connects to a UCI S100 board by means of a 64-wire ribbon connector. The IBM-compatible controller allows users to move the hard disk to an IBM-compatible computer if desired. During installation, you mount the Western Digital board on top of the hard drive.

UCI supplies its own hard-disk utility software in the form of a program that gives you the following options: SHIP, to place the disk read/write heads over an unused section of the disk; DETECT, to find sectors that have gone bad since the initialization of the hard disk; PART, to partition the hard disk; and INIT, to initialize the hard disk. As with Heath/Zenith's Z100 hard-disk system, UCI requires that a jumper plug be installed on the controller board while you perform an initialization. Afterward, you disable the jumper to prevent the possibility of accidental initialization.

If you have UCI's EasyPC IBM-emulator board, you can use the EasyWIN system with both the Z100 side and the IBM-compatible side. A separate IBM partition is required for the IBM-compatible side, however. And when you're in the IBM-compatible mode, no means is currently provided to access files that reside in the Z100 partitions. (One solution to this problem involves the use of the EasyRAM board explained below. And J. J. Thompson offers software that bridges the two operating systems.)

In the Z100 mode, I get a DEVICE ERROR message on my first attempt at a boot after turning on the system. It boots immediately thereafter, though. Dr. Cheung from UCI tells me that the problem is due to the amount of time required for the heads to move from the ship position at the center of the disk. He said that the problem would be solved in a future release of the routines stored in the EasyWIN's read-only memory (ROM). This problem had no effect on the operation of the hard disk. It was simply disconcerting until I learned that there was actually nothing wrong.

Also, I have noted that the drive makes a prolonged clicking sound whenever the Z100 is powered up. This also does not seem to affect the drive's operation once the machine is booted.

To establish an IBM-compatible section on the hard disk, you first operate the EasyPC in the Z100 mode. Here, you use the PART section of the UCI hard-disk

utility to generate a partition named UCI. Later, when you have booted in the IBM-compatible mode, the computer will recognize this partition as drive C:, and you can format it.

This hard-disk system certainly works. It is easy to install, and it offers compatibility with both the Z100 and IBM-compatible sides of the computer. The prices are reasonable, and I certainly do recommend it.

EasyRAM

The EasyRAM is a memory board that can contain up to 2 MB of random-access memory (RAM), and four such boards can be installed in the system. With the full 2 MB, the board goes for $564.

The EasyRAM can be used either to emulate a disk drive or to expand the Z100's available system memory (either with or without the EasyPC board).

This allows as much as 8 MB of RAM-disk storage space. (No single logical RAM disk can be larger than 2 MB, though.)

The RAM disks use UCI's rather unusual RAM-disk software. The memory can be divided into as many as eight sections, each separately addressed as a logical drive (drive I: through drive P:). Unlike most other RAM-drive software systems, these drives can be resized or even eliminated without rebooting the system. It is also possible to reboot the computer and have the files in the RAM drives survive. (An optional battery-backup system will allow the files on the RAM drives to be retained even if the computer is turned off.)

One way to transfer files from the EasyPC's IBM side to the Z100 side is to load the files into a RAM disk while in the IBM-compatible mode; then reboot the system as a Z100. On the command line to rerun the UCI RAM-disk software, you then set the /L switch to relink with the RAM disk already established. Then you can access the files on the "old" RAM disk; they will appear exactly as they were in the IBM-compatible mode. This technique will also work for transferring files in the other direction, from the EasyPC's Z100 mode to its IBM-compatible mode.

For my part, I am partial to large RAM disks such as this 2-MB system. I should point out that the UCI board is available in sizes smaller than 2 MB. (With 1 MB, the board costs $446; with 512K, it's $387.) In my opinion, though, once you have committed yourself to investing in such a product, you should go for the fully loaded board. You will certainly wind up expanding to the full-sized board before you are done.

The UCI RAM boards are the most reasonably priced Z100 RAM boards I have seen. (They are also specially designed for use with the EasyPC. Other S100-bus boards may not work in the IBM-compatible mode.)

The V1 Video Enhancement Kit

I have recently found a new party in the Z100-support business, Hughes Development Systems. This company is offering the V1 Video Enhancement Kit. It costs $139, and gives you an additional 64K of video memory. The computer can then bank-switch to this memory, giving you a fourth plane of video memory, called the intensity plane. You can then write Z100 programs that produce an intensity signal, which allows 16 colors rather than the usual eight. (Paul Herman is offering software using this capability.)

The V1 also has a palette capability that consists of a conversion circuit placed between the video memory and the monitor. This allows you to map any color into another color without changing the contents of video memory, making the color remapping invisible to any application program being run on the Z100.

The V1 board and associated cables are physically installed between the video and main boards of the Z100. No trace cutting or soldering is involved in the installation. The entire project can be completed in about one hour. (Paul Herman says he did his installation in half an hour. He's quicker than I am.)

The basic configuration of the Video Enhancement system supports only the color-monitor (RGB) output. To add support for the monochrome-monitor (composite) output, you need to purchase an optional hardware modification from Hughes. I agree with Hughes on this approach. The hardware needed to make the monochrome monitor see 16 levels of intensity is probably not worth the investment. The best bet is to simply use the color-monitor output. Hughes has left the decision up to the user.

My overall impression of this product is that it is a new idea, and it's well implemented. One does not see many improvements to the original H/Z100 design. This is one.

Additional Information

KAL1000 local area network (software and support board), $445 per Z100 node; $395 per IBM-compatible node.
SoftNet Communications, Inc.
15 Hillcrest Drive
Great Neck, NY 11021
516/829-6536

HyperAccess, $149; second copy for direct connection, $30.
Hilgraeve, Inc.
P.O. Box 941
Monroe, MI 48161
800/826-2760 or 313/243-0576

EasyWIN, 21 MB, $632; 31 MB, $727.
EasyRAM, 512K, $387; 1 MB, $446; 2 MB, $564.
UCI Corporation
948 Cherry Street
Kent, OH 44240
216/673-5155 or 800/UCI-COMP

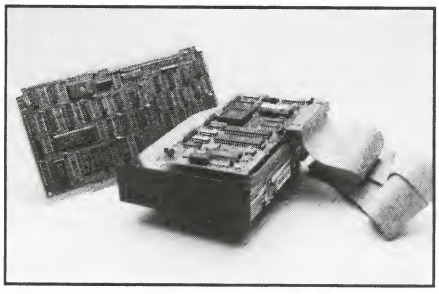
J. J. Thompson
281 Warren Avenue
Kenmore, NY 14217
716/873-0380 after 5 p.m. Eastern time

V1 Video Enhancement System, $139; V1-M Monochrome Option, $29.
Hughes Development Systems
10101 S.W. Freeway, Suite 400
Houston, TX 77074
713/772-2840

Paul Herman, Inc.
3620 Amazon Drive
New Port Richey, FL 33553
813/376-5457 △

NEW PRODUCT ANNOUNCEMENT

UCI Mini Catalog:



EasyWIN

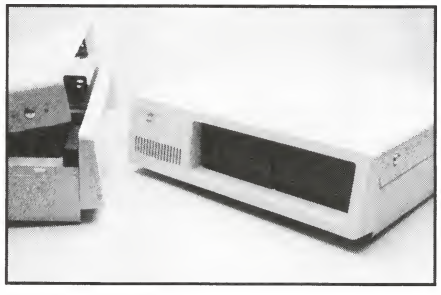
Most economical hard disk system available for the Z-100. It replaces the Z-217 hard disk system and works just like it. You can prep it, part it, and boot from it.

Features:

▪ Direct replacement of Zenith Z-217 Winchester disk. ▪ Controls 2 physical drives. ▪ Supports auto boot, all Z-100 formats, and Zenith diagnostics. ▪ Operates in any Z-100 with or without EasyPC. ▪ Future support of other hard disk controllers, removable cartridge drives, etc. ▪ Operates at 5 or 8 MHz.

Includes:

▪ Intelligent controller card to adapt IBM PC compatible hard disk controller to the Z-100. ▪ Western Digital PC hard disk controller card. ▪ Seagate 10/20/30 MB hard disk drive (ST215/225/238). ▪ Drive cables. ▪ Fully documented User's Manual.



Z-148 Expansion Chassis

Finally a way for Z-148 users to take advantage of the growing world of IBM PC hardware including EGA, PGA, modems, hard disk drives, multifunction cards, etc.

Features:

▪ 8 available slots: 6 full PC slots and 2 half-size slots. ▪ 135 watt switching power supply with built-in fan. ▪ UL and FCC approved chassis and power supply. ▪ 5 or 8 MHz no wait state. ▪ Standard internal mounting brackets for 2 full-height or 4 half-height drives. ▪ Easy access, flip top metal case.

Includes:

▪ Z-148 adapter. ▪ 5 ft. shielded cable. ▪ Fully documented Installation Manual. ▪ Dimensions: 17.5″ D × 19.5″ W × 5.5″ H. ▪ Weight: 25 lbs. ▪ Color: Ivory.

Call now for your copy of the Fall '86 Edition of the UCI Product Catalog.

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The Last National HUGCON

Good buys, and some goodbyes, were the order of the weekend just outside Chicago.

Victoria Saxon

With a mixture of anticipation and regret, almost 750 members of the Heath/Zenith community and their guests filed into the banquet room of the Hyatt Regency O'Hare in Chicago on the second evening of the 1987 International Heath/Zenith Users' Group Conference. The anticipation came from the ever-present hope we all felt that maybe—just maybe—we would win our very own portable computer or perhaps a gift certificate for products in the Heath catalogue. The regret arose from HUG's recent announcement that the 1987 international conference would be the last: Future conferences would be regional.

Despite the mixed feelings, Saturday night's banquet was the highlight of the sixth International HUGCON. The conference had begun the previous day (Friday, August 21) and would end the following afternoon (Sunday, August 23), drawing close to 1,000 people. The banquet was nestled between Friday's cries of "Gee, look at all the neat things to buy!" and Sunday's laments of "Uh-oh, how am I going to feed my kids for the next month?"

Surprisingly, the banquet food was good. We had just finished our chocolate mousse when the man next to me at the table commented that he hoped Jim Buszkiewicz (*REMark*'s managing editor) would speak, because he always livens up a party with his jokes. Sure enough, even before our dessert dishes were cleared, Jim was up on stage, making us laugh in the way that only Jim Buszkiewicz can.

Some interesting facts about HUGgies

A giant balloon arch and two huge balloon bouquets formed an impressive backdrop on the stage. Jim told us that we were not the only group holding a conference at the Hyatt that weekend: There was also the Balloon and Singing Telegram Conference. Although these folks had kindly provided some balloon decorations for our banquet, Jim refused to provide us with a singing telegram.

He did, however, tell us some interesting facts about the HUGCON attendees. Present at the conference were two people from Israel, two from El Salvador, and HUG members from Hawaii, Bermuda, and Naples, Italy. Representatives from over 25 local HUGs introduced themselves. They ranged from a single member representing half of a HUG in "the middle of Georgia" to 30 representatives from the Capital Heath Users' Group, with a membership of 900.

> ***HUGCON was the H386 kit's first public showing.***

Of the nearly 950 HUGCON attendees, Jim said that about 400 own H/Z100s; 420 own IBM-compatible machines; 210 own 8-bit machines (H8s and H89s); 7 own portable computers; and 244 own "others."

One man at the banquet owns 34 H8s. When asked whether he had yet discovered that the H8s were not IBM-PC compatible, he replied: "Are PCs H8-compatible yet?"

We also learned that this year marks Heath Company's 40th anniversary, and that 25% of Heath's sales over those forty years have been in computers.

John Frank takes the stage

After Jim Buszkiewicz's opening remarks, HUGCON banquet attendees were given another treat: John Frank, the new president of Zenith Data Systems, spoke a bit about his new job, and how he expects to direct Zenith Data Systems. Frank expressed his amazement at the turnout and enthusiasm for HUGCON, then described what he thinks are the three ingredients of a successful business.

He stressed that it is important first to have an aggressive product plan that allows for development within the accepted standards of the industry, and to strive to go beyond those standards.

The second ingredient for a successful business, said Frank, is to have an aggressive sales and marketing division. Frank remarked on ZDS's effectiveness in selling computers to the college, government, and top business markets. Last year, he said, 25,000 college students graduated owning Zenith computers. ZDS anticipates that 40,000 students will graduate with Zenith machines next year. This leads to speculation that increasing familiarity will be a boon to Zenith when students who become decision-makers in business are called upon to buy computer systems.

The third ingredient, Frank said, is to have satisfied customers. He hopes that ZDS will continue to satisfy its customers under his leadership.

Frank is not a newcomer to Zenith Data Systems. He started with the company six years ago as national sales manager, with a staff of one. He has seen the company develop over his six-year employment, and said he is pleased that Heath and Zenith are working together as one company. Frank thinks that there is a new level of relationship—both between him and Bill Johnson (president of Heath Company), and between the older members of the Heath Users' Groups and new Heath/Zenith computer users and members.

Awards, chuckles, and a few rewards

After we heard from John Frank, Jim Buszkiewicz resumed the stage to hand

---

Victoria Saxon is a former Sextant *employee. After HUGCON, she headed for the West Coast to try her hand in the film industry.*

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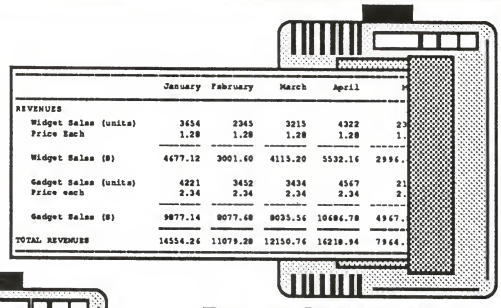

	January	February	March	April
REVENUES				
Widget Sales (units)	3654	2345	3215	4322
Price Each	1.28	1.28	1.28	1.28
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Gadget Sales (units)	4221	3452	3434	4567
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Gadget Sales ($)	9877.14	8077.68	8035.56	10686.78
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Multi-Function Software Supercharger for CP/M

NEW for Heath/Zenith

Profiles magazine wrote, *"PRESTO still has the edge over Write Hand Man in features and general polish..."* And now we've improved it even more! PRESTO adds features to any program you run. Just hit a special trigger key and PRESTO suspends your current program and opens a window on-screen. You can then call up a floating point calculator, a programmers calculator (hex, binary, octal, decimal), a notepad, a perpetual calendar, a Rolodex™, and perform screen dumps. Hit another key and you're right back where you left your original program.

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NEW CP/M Commands: From within any program you can now do a directory, copy and rename files, erase files, and type files to the screen.

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And best of all — the price is just **$39.95**. Available for all Heath/Zenith CP/M computers using H19/89 type terminal. Versions are also available for Morrow, Osborne, Kaypro and Otrona. Specify computer and hard or soft sector format.

RemBrandt

Complete Business Graphics Toolkit™

Finally there's an easy and fun way to create graphics on your H/Z-89, H/Z-90, H/Z-100 *(CP/M only)* computer or any H/Z-19 equipped machine.

No extra hardware required! It works with a standard unmodified machine yet also supports the TMSI SuperSet ROM, and the Font19 Character ROM.

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Affordable: Even with all of this power, REMBRANDT is available for an amazingly low price of... ***$39.95***

REMBRANDT runs on H/Z-89's, 90's, 100's and H/Z-19 equipped machines.

Other Stuff: **MILESTONE** Business Project Planner (CP/M and MS/DOS) $99.95, **MEDIA MASTER** Disk Conversion (Z-100, PC-DOS) $39.95, **MEDIA MASTER PLUS** Disk Conversion & CP/M Emulator $59.95, **ACCELERATE 8/16** including V20 chip $99.95

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out the annual HUG awards. Joe Katz, columnist for *Sextant* and *REMark*, received the "User of the Year" award, and, upon accepting the award, commented: "For once, I have no words. Thank you very much."

The Software Group received the "Vendor of the Year" award for its support of the Z100. The company has recently been in the news because Enable, its multifunction software package, was included with the U.S. Department of Defense/Zenith contract for the '181. Enable is an integrated program that combines data base management, graphics, word processing, spreadsheet, and communications capabilities.

Herb Friedman (who organized last year's Western Regional HUGCON) and Jim Jones each received lifetime HUG memberships for their support of the Heath Users' Group.

Two surprise awards were also presented. Former HUG Manager Bob Ellerton received a plaque for seven years of dedicated service to the Heath Users' Group. And for constantly ribbing Jim Buszkiewicz about his tie selection, Polly Gilmore, wife of Heath Vice President Chas Gilmore, received the tie Jim had worn all day Saturday.

This year's entertainment was provided by comedian Dick Hardwick. Hardwick has purportedly entertained audiences at Disneyland's Golden Horseshoe Review for the past nine years, and had about five seconds of stardom in the motion picture, "Nothing in Common."

The awarding of door prizes rounded out the evening. Two children received Heathkit color television kits, and two other children got Fischertechnik kits. *Sextant*'s technical editor, John Walker, received a box of 70 disks containing HUG's entire library of IBM-compatible public domain software. (John begrudgingly admits that he may now have to buy ZPC to make his Z100 IBM-PC compatible.) Two people (including Bob Gray of Graymatter Application Software) received HS-148s.

John Guenther of Zenith's federal office had donated a Z386, which went to one lucky prizewinner. Zenith's commercial office responded by giving away a Z181 portable computer. Shortly thereafter, the "Joe Schulte-Bill Johnson Show" began: First Joe Schulte, president of Veritechnology, gave away an HS-248-S; then Heath Company President Bill Johnson awarded an HS-386. Joe Schulte gave away a ZP-150; and Bill Johnson countered with five $100 gift certificates from Heath. Then Joe Schulte handed out two more ZP-150s; and Bill Johnson finished things off with a $500 Heath gift certificate.

Those few of us who left the banquet with no new computers or certificates were heartened in knowing that the independent vendors would be giving out still more door prizes during the rest of the conference. And, of course, there was one other bit of encouraging news: Jim Buszkiewicz announced that there was a very little bitty chance that this would not be the last International HUGCON. . . .

A walk through the vendor area

Ten years ago, the Heath Users' Group was formed for users of the H8, the H11, and the ET3400. Walking around the vendor area on Friday afternoon, I couldn't help thinking how odd it must be for those original users to see how much has changed over the years. As may be expected, the change has mixed some bad with some good. While support for H8 users has all but vanished, the progress Heath/Zenith has made has been tremendous. And although the experimentalist attitudes of some earlier users may have been lost, there is still a sense that HUG members know a lot more about their computers than average computer owners do.

The first booth I visited belonged to Kres Engineering. The people at Kres showed me their High-Performance SSM-150 Speed Kit for '150-series computers. This kit can almost double the '150's 4.77-MHz clock speed. Kres also had on display an RSS-148 '148 System Reset and Speed Switch.

Next, I stopped at the Disk Movers booth. The company offers a wide variety of colored diskettes as well as disk storage boxes. One of these storage boxes had a wooden rolltop similar to an old-fashioned rolltop desk.

Hogware's General Manager, Janet Hirsch, was displaying ShowOff at her booth. ShowOff is Hogware's high-resolution graphics-display program for the Z100. It offers 640 by 480 pixels of resolution and 92 colors, and also provides many different painting patterns. Using ShowOff, a Z100 owner can capture and enhance graphics on his computer. The program lets you draw on the screen, using a mouse, arrow keys, or a digitizing pad.

On Saturday, Ms. Hirsch gave a seminar on Z100 graphics using ShowOff. During this talk, she showed several slides of graphics created with or enhanced by ShowOff. The pictures were quite impressive.

ShowOff is sold for $79, or for $169 with a Logitech C7 mouse. It requires 384K, three banks of 64K video memory, and version 2 or higher of the Microsoft Disk Operating System (MS-DOS). (Z100 owners interested in finding out more about ShowOff may obtain a demo disk from Hogware for $3.)

Hogware also offers Logitech's Personal Publisher, desktop-publishing software that allows a user to combine graphics with text. This program is best for small projects. (It is not quite as high-powered a program as Aldus' PageMaker, which may be used for publishing, say, a full-length

newsletter.) It requires HUG's ZPC to run on a '100, and it may be purchased from Hogware for $74.

More '100 and '150 support

Darrell Pelan, managing the Micronics Technology booth, was offering a new speedup modification for the Z150. This circuit board is software-controllable and doesn't affect the MS-DOS clock or sound generation on the system. The unit normally costs $34.95, but the show price was $32.

Micronics Technology was also selling SmartWatch for the Z150/160. Priced at $45, SmartWatch installs in the computer's ROM socket. Pelan was also offering a Winchester drive for the H/Z89 at a special show price of $575.

Robert Beasley of Bea-Soft had such confidence in his products that he was handing out guarantees with his picture on them. He was offering special HUGCON prices on hard-disk drives, including a 20-megabyte hard disk for $320, 30 MB for $350, and 40 MB for $440. Beasley was also offering 20 MB for the Z100 that runs from an existing Winchester card in the computer. Beasley said the advantage of this product is that it will add 20 MB to a Z100 for two hundred dollars less than usual.

In the booth next to Bea-Soft, the folks from GraphNet Systems were showing off a 310-MB hard disk with a 27-millisecond average access time. The hard disk was being sold, complete with public domain software, for $4,850.

Marc Brooks, of Controlled Data Recording Systems, Inc. (C.D.R.), was justifiably enthusiastic about his new CDR317 controller for the Z100. The controller allows the Z100 to talk to three different disk drives at once. To demonstrate it, Mr. Brooks used the controller to hook up his Z100 and the Z100 from Kres Engineering's booth to three drives: a Kodak (DTC) cartridge-removable drive, a Seagate 225 drive, and a Rodime drive. Mr. Brooks said the CDR317 controller adds "a lot more power and flexibility" to the Z100 without changing Z100 software. Because the controller is SCSI-based (conforming to the Small Computer Standard Interface), it will allow access to many SCSI-based devices, including Bernoulli boxes and SCSI networks.

Bargains and some unique products

ACCESS, describing their products as "Affordable Computer Components, Equipment, Supplies & Services," was offering just that. The booth was crammed with printer paper, printwheels, diskettes, storage cases, and other supplies, at very affordable prices. ACCESS also sells computer printers.

And speaking of good prices, Al Davis Enterprises had lots of deals for HUG enthusiasts. Mr. Davis's wares included a '248 kit for $550; a Z248 CPU/memory board for $75; and Z100 8-MHz boards for $100.

Megamicro Computer Center sells software for IBM-compatible computers. One HUGCON special was the King James version of the Bible, available on 16 disks.

Eight-bit-computer enthusiast Kirk L. Thompson was selling keyboard overlays at his booth. He was also nice enough to hand out copies of *The Staunch 8/89'er* newsletter (as a favor to its editor, Hank Lotz), and copies of the Quikdata catalogue of hardware and software products.

My next stop was Zyzx, Inc.'s booth, to view the company's HERO 1-IBM Development System. Described as "the ultimate niche product," the system is an assembler/compiler and debugger that allows users to program their HEROs (HEath RObots) using an IBM-compatible computer. The advantage of this package is that users can program their robots on a computer keyboard in English, instead of having to lean over the robot to type code in the form of letters and numbers. (During programming, you need a serial cable to attach the computer to the robot.) Regularly priced at $119, the system had a special show price of $99.

More vendors

Shing Wong, president of Wong's Advanced Technologies, Inc., was proudly offering the Evergraphics Deluxe, a high-

resolution graphics adapter, at a special show price of $179. The adapter features 1024-by-704-pixel resolution, and is Hercules-Plus compatible. It's available for Heath/Zenith's IBM-compatibles.

Mr. Wong was also displaying a Teknika M3-503, 13", multi-standard monitor. The monitor features 926-by-580 resolution, and was show-priced at $475.

It was especially exciting to stop by the WindowDOS Associates booth. At the time of the conference, version 2 of WindowDOS had been out for about three months. David Thomas, who developed the program with his partner, Frank Dever, was at the booth demonstrating it for passersby.

Basically, WindowDOS allows a user to access any MS-DOS functions while in any program. For example, if you're working in your word processor and can't remember a particular filename, you can use the List command to pull up a window on your computer screen and find the filename you want.

Because WindowDOS is memory resident, it can be accessed from any program. It takes up only 50 kilobytes of memory, and runs on IBM compatibles.

WindowDOS was favorably reviewed

Vendors at HUGCON '87

ACCESS
P.O. Box 1053
Norristown, PA 19404
215/279-3320

Audio-Visual Entertainment Software (A.V.E.S.)
P.O. Box 763
Potsdam, NY 13676

Bea-Soft Computers
P.O. Box 319
Shalimar, FL 32579
904/651-9231

C.D.R. Systems, Inc.
7210 Clairemont Mesa Boulevard
San Diego, CA 92111
619/560-1272

Computer Consultants to Business
1033 Bishop Walsh Road
Cumberland, MD 21502
301/759-1260

D-G Electronic Developers
700 South Armstrong
Denison, TX 75020
214/465-7805

Al Davis
4894 Lake Chapin Road
Berrien Springs, MI 49103
616/471-1792

Disk Movers
8534 McCormick Boulevard
Skokie, IL 60076
312/679-3727

Ecosoft, Inc.
6413 North College Ave.
Indianapolis, IN 46220
317/255-6476

Generic Computer Products, Inc.
P.O. Box 790
Marquette, MI 49855
906/249-9801

GraphNet Systems, Inc.
P.O. Box 337
Reading, PA 19603
215/376-5043

Graymatter Application Software
1601 Township Line Road
Norristown, PA 19401
215/279-4460

Heath Company
Benton Harbor, MI 49022
Orders: 800/253-0570; in Michigan and Alaska, 616/982-3411. General Office (non-order calls): 616/982-3200.

Hilgraeve, Inc.
P.O. Box 941
Monroe, MI 48161
800/826-2760; 313/243-0576

Hogware Company
470 Belleview Ave.
Webster Groves, MO 63119
314/962-7833

Jay Gold Software
P.O. Box 2024
Des Moines, IA 50310
515/279-9821

Kres Engineering
P.O. Box 1268
La Canada, CA 91011
818/957-6322

Megamicro Computer Center
P.O. Box 39070
Philadelphia, PA 19136
800/433-MEGA

Micro Doc
3108 Jackson St.
Bellevue, NE 68005
402/291-0795, 7-10 p.m. Central time

Micronics Technology
449 Barbados Way
Niceville, FL 32578
904/897-4257

Newline Software
P.O. Box 289
Tiverton, RI 02878
401/624-3322

New Orleans General Data Services, Inc.
7230 Chadbourne Drive
New Orleans, LA 70126
504/241-9495

PC Technologies, Inc.
704 Airport Boulevard
Ann Arbor, MI 48108
313/996-9690

Powerline Systems
P.O. Box 97
Lincroft, NJ 07738
201/747-2063

Public Brand Software
P.O. Box 51315
Indianapolis, IN 46251
800/IBM-DISK

The Software Group
Northway Ten Executive Park
Ballston, NY 12019
800/634-3470; in New York, 800/551-1004

Kirk L. Thompson
#6 West Branch Mobile Home Village
Route 1
West Branch, IA 52358

Barry A. Watzman
560 Sunset Road
Benton Harbor, MI 49022
616/925-3136

WindowDOS Associates
Box 300488
Arlington, TX 76010
817/467-4103

Wong's Advanced Technologies
3201 Loyola Drive
Kenner, LA 70065
800/626-1030; in Louisiana, 504/464-7379

Zenith Data Systems
1000 Milwaukee Ave.
Glenview, Il 60025
800/842-9000, ext. 1

Zyzx, Inc.
P.O. Box 4194
Arlington Heights, IL 60006
312/870-0938

in the May issue of *PC World*, the June issue of *REMark*, and the August issue of *Computer Shopper* (which rated the program first of about a dozen such programs).

Generic Computer Products, Inc. was offering free disks to HUGgies in exchange for their favorite computer jokes. I didn't get a chance to ask them if they had heard any particularly good jokes, but I'm sure they were well entertained throughout the weekend. Generic was also selling Generic CADD version 3, Dot-Plot, Auto-Convert, and Draft Enhancements 1 and 2. In addition to many other discounted software offers, the Generic price list included an expanded line of products from Borland International, including Turbo BASIC, Turbo C, Turbo Pascal, and others.

Fun and games and some real deals

For those attendees interested in some fun and games, A.V.E.S. (Audio Visual Entertainment Software) was offering 25% discounts on its video games. Peder Jungck and Brad LaRonde co-founded this company about two years ago while in college. They're still in college, and they're still in business selling a number of fun-looking games for Z100s and IBM clones.

In "Operation: Airlift," the user pilots a helicopter into enemy territory to rescue hostages. In "Silent Runner," you climb ladders and ropes to escape crazy little video monsters. There's supposed to be a surprise ending if you get through all 99 levels of play, but Brad (the program's author) refused to reveal what it is. Peder's "Star Hawk" requires the user to fight off bug-like characters in space.

A.V.E.S. also offers programs designed to help users write their own graphics. All the programs are reasonably priced, and will undoubtedly provide hours of fun.

Over at PC Technologies' booth, sales manager Bradley Lahr extolled his company's 286 Express Card—a half-slot accelerator card for the Z150 and other IBM-PC and XT compatibles. It gives the machines an 80286 processor, added speed, and a "hot key" that enables or disables 8K of RAM without the user having to reboot the system. The 286 Express Card also allows a user to toggle between 80286 and 8088 processing. Regularly $595, the 286 Express Card was specially marked at $395.

PC Technologies' Ramracer offers the same features as the 286 Express Card, but adds 2 MB of expanded memory, and emulates Expanded Memory Specification (EMS) and Enhanced Expanded Memory Specification (EEMS) RAM. The 286 Ramracer is normally sold for $745, but the convention price was $495.

Barry Watzman's Addresselope program was so new, he said, he could sell the software at the conference, but the manual was not expected to come out for another week. Addresselope is a memory-resident program designed to help users address envelopes with their computer. The program features "address capture capability," which means the program is smart enough to take an address off the top of a letter instead of requiring the user to retype the address for printout on an envelope. Addresselope was specially priced for HUGCON at $24.95, ten dollars off its regular price.

A friendly pair, John and Sheelah Preusse, of Powerline Systems, gave me a thorough demonstration of Jupiter, their records management program. This program is efficient and user friendly, and is designed to maintain information about people. Mr. Preusse uses it to keep track of his clients, and is able to easily call up any individual's address. He can also keep track of the correspondence he has had with any one client by using the "notes" section of the client's file.

The program is smart enough to handle foreign addresses and telephone numbers, and still take care of little things such as capitalizing names. If you have someone's record on screen and want to send a letter to that person, you need only to send the file to the printer, and the program will take whatever information it needs from the record to print an envelope or a form letter with the person's correct address. One of the nicer features of Jupiter is that unused space in a particular person's record does not take up any

memory. Jupiter is available for IBM compatibles and the Z100, and requires 192K. It costs $99.95 (show price, $75).

Powerline Systems also offers Coupon, a program designed to help homemakers organize their coupons. Mrs. Preusse claims she saves several dollars a week using this program. Coupon costs $29.95.

More visits with vendors

Ecosoft, Inc., was offering its new Eco-C88 Modeling Compiler (regularly $99.95); its C-more symbolic debugger (regularly $49.95); and its computer-assisted instruction on C, written by Dr. Jack Purdum, all for only $75. Dr. Purdum, one of the three people at the booth, said he thinks the best aspect of the C88 C compiler is its error-checking capabilities. This undoubtedly saves the user a lot of time.

Newline Software is looking a lot different than it did a few years ago. The company has closed out its eight-bit line, and now sells a full supply of IBM-PC-, XT-, and AT-compatible software and hardware. Newline's Ron Rocheleau was offering his Professional Text Processor, originally $100, for only $10. He was also selling Newline's Professional Spelling Checker for $10 (originally $50).

The big news for Hilgraeve, Inc., is that Zenith has proposed that HyperAccess be included as part of the Z248 contract with the Air Force. HyperAccess is Hilgraeve's communications program for the '100 and all PC-compatible computers. Hilgraeve has just released a revision of HyperAccess for the '150 and '200 machines, but not for the '100.

The PC-compatible revision includes several important changes, including faster file transfer; the addition of an ANSI emulator; availability in 3½" format (for laptop use); and support of the COM3 serial port.

When the vendor area finally closed on Friday evening, not all HUG members went back to their hotel rooms for the night. Instead, a few dedicated eight-bit users went to Len Geisler's hotel room to discuss their H8s and H89s. Mr. Geisler is the founder of the Society for Eight-Bit Heath Computerists (SEBHC), and publisher of the *SEBHC Journal*. He called the meeting because he is interested in keeping the experimentalist attitude of the early eight-bit users alive. I think he was also interested in showing off his best eight-bit friend, "Heather," a Super H89A.

More chats with the vendors

On Saturday, I had the chance to talk with Jay Gold of Jay Gold Software about his new Home Finance III program. The data base allows the user to keep records and track cash flow on up to 100 asset accounts and 100 credit accounts. This new version of the Home Finance System has two advantages: it is much faster than earlier versions, and it is geared toward the home user (i.e., it doesn't use a lot of difficult accounting jargon).

I next went over to the booth shared by New Orleans General Data Services and Micro Doc. NOGDS was offering version 2.1 of Flexi-Graph, its graphics program for the Z100 and Zenith's IBM compatibles. This latest version of Flexi-Graph supports color EGA and comes with a new programmer's reference manual.

Fred Pospeschil of Micro Doc was showing displays from the Micro World Data Bank II. This map data base has been extracted from the files of the National Technical Information Service. It lets you display the globe from practically any point of view. That was fortunate for *Sextant*, because we wanted a map showing part of Canada's Northwest Territories. (See page 13 of this issue and "Supplier Notes," *Sextant* #29, May-June 1987.) Micro Doc sells this public domain software package for $10.

George Sellers of Computer Consultants to Business had his whole family at his booth. The company was selling a number of products, including the Coordinator System software package. The system is designed to help businesspeople communicate with their associates either by modem or by network.

The Coordinator System is an organizer of sorts, as it contains a daily calendar,

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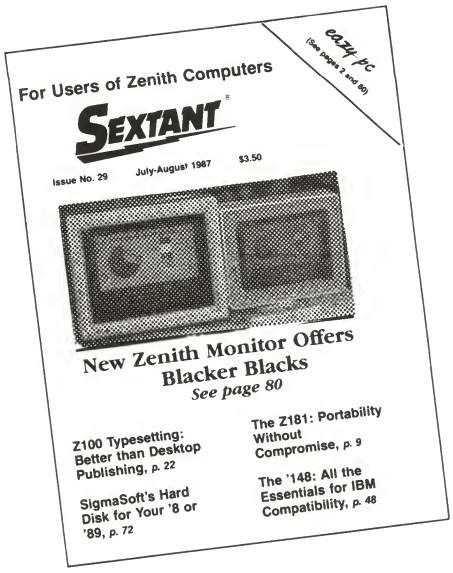

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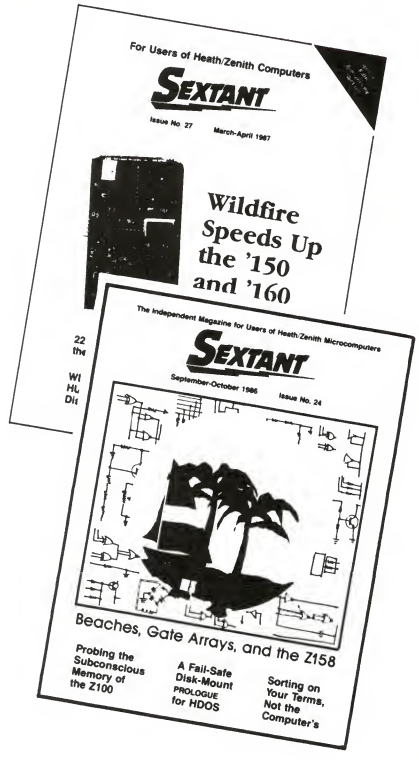

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and keeps records of telephone conversations. It also provides access to reports and other important documents.

Mr. Sellers also had an Epson Image Scanning device that interfaces with the Epson EX1000, EX800, and LQ2500 printers. To use the device, you just take out the printer ribbon and replace it with the scanning head. Then you roll a picture through the printer (as you would any other piece of paper), and the scanner will read the picture. Mr. Sellers was offering the image-scanning device for $250.

True to its name, Public Brand Software was offering a full line of public domain and user-supported software, at only $5 a disk. The company's 67-page catalogue features word processing, communications, and graphics packages, in addition to a number of other programs.

At the D-G Electronics booth, you could find Bruce Denton—when he wasn't leading one of the three "Hardware 'Bull' Sessions for Old and New Computer Users." D-G was one of the first companies to provide add-on boards for the H8 and then for the '89. Currently, though, they mostly do custom design and consulting. (Bruce said that D-G still keeps older boards in stock; so if you've wondered about upgrading your older equipment, it might be good to check.)

Heath's product lines

The HUGCON discussion groups were held all day Saturday and the first half of Sunday. Eight or so different discussion groups went on during each 90-minute time slot. It was difficult to decide among the many alternatives, even though some of the talks were offered more than once.

I decided to spend Saturday morning at the "Heath Company's Product-Line Managers' Presentation." Wayne Wilson, product-line manager for Heath's weather, TV, and amateur-radio division, started things off by telling us about what's new in his department.

Wilson was pleased to announce that Heath has made its kits a lot easier to assemble than in the past. For one thing, the little, easily lost parts are now put together on a "lead tape" in order of their assembly. Furthermore, most of the complicated boards now come pre-assembled, and the manuals have been divided into sections to allow the kitbuilder to concentrate on only one circuit board at a time. Wilson said Heath has also tried to eliminate, whenever possible, the need to use test equipment. All in all, the new improved kits are intended to replace tedium with fun kitbuilding.

ZDS anticipates that 40,000 students will graduate with Zenith machines next year.

Heath's brand-new terminal node controller, The Pack-Kit Multi-Mode TNC, allows the amateur-radio enthusiast to connect a computer to radio equipment to get into packet radio—computer networking on the air. Wilson said the packet radio can pick up weather facsimiles—weather maps the computer can print out on a dot-matrix printer. With the packet radio, a Heath/Zenith computer user can communicate with other hams fairly easily. In fact, according to Wilson, using the packet radio is a lot like using CompuServe, except that you don't have to pay each time you use it. The system may be used with any modem communications package, and is capable of receiving Morse code, radio teletypewriter, and other code.

Denton Bramwell, Heath's product-line manager for kit computers and kit instruments, proudly spoke of Heath's new IC-1001 Logic Analyzer for testing digital circuits. Bramwell had seen a competitor's logic analyzer advertised for $1,150 (Heath's costs $269), and said the competitor's product was "the same as ours, only maybe not as good." (See "Supplier Notes," *Sextant* #30, September-October 1987)

Bramwell was, understandably, also very proud of the H386, the kit version of the Z386. HUGCON was the H386's first public showing. The computer's 80386 microprocessor works at 16 MHz, a noticeable improvement over other CPUs. The '386 comes standard with 1-MB RAM and a video board. The kit was being sold at HUGCON for $3,349, and is fairly easy to build.

Bramwell said his department is very interested in developing future products for the kit line. He asked HUGCON attendees whether they would be interested in buying a powerful portable computer kit, and he received an enthusiastic response. HUGgies also expressed interest in a flat-tension-mask monitor kit for $750 (assembled monitors sell for almost $1,000), so if these products come out on the market soon, you'll know why.

Next, we heard from Jim Wilson, product-line manager for educational systems. Wilson told us a bit about the new EZ-150 troubleshooting computer. The computer, based on the Z151, was introduced to schools in July but is not planned to be released to consumers. The EZ-150 allows the student to troubleshoot, and learn to become a better technician. Because the computer must stand up to constant handling, it was

Attention H/Z PC-Compatible Users!

If you use a '150, '200, or other Heath/Zenith computer compatible with the IBM PC, Sextant *would like to hear from you.*

We will soon be conducting a survey of H/Z PC-compatible users. If you'd like to participate, please

Circle #249 on the Reader Service Card between pages 46 and 47.

designed to be rugged.

In July, Heath also introduced a new line of trainers to be used with their educational courses in electronics, computers, robotics, and lasers. The new line includes the Analog Trainer, used in experimenting with electronic circuits, and its expansion module, the Accessory Backpack. The Analog Trainer comes with an internal power supply and an internal, liquid-crystal display (LCD), digital multimeter.

Wilson also said that he expects a couple of new training courses to be released a few weeks after HUGCON. One of these courses teaches artificial intelligence, and the other, already listed in the Fall 1987 Heath catalogue, is the Microcomputer Professor course for beginners.

Mark Witsaman is Heath's product-line manager for computer-based instruments. He spoke about the new logic analyzer (mentioned above) and the SW-3000 Computer and SW-3010 Industrial Monitor. (See "Supplier Notes," *Sextant* #30, September-October 1987.) The SW-3000 is like the '248, except that it is more rugged and can withstand more vibration and shock.

Ed Quinones told us about Heath's Buy-Sell product line. This line covers products sold by Heath but manufactured by other vendors.

The Buy-Sell division recently introduced an exciting new color printer, the PP3630 ink-jet printer, priced at $1,399. The printer features 180 dots per inch, and can print 167 characters per second and 330 different colors.

Heath will also soon be selling, for $595, the Intel Above-Board PF-286 (Heath model #PC-4120), which allows H/Z151 or H/Z200-series owners to upgrade their computers. It is expandable to 2 MB. An optional, additional 2-MB piggyback board is also available.

One other new product in the Buy-Sell product line is an expansion card for weather observers. The weather card works on the H/Z150 and H/Z200 series computers, and costs $450.

Getting an inside view . . . of drives

The next lecture I attended was Ron Hackney's "Computers for Beginners," in which I got to see the insides of a floppy disk and a disk drive. Hackney, who was busy explaining how computers work, passed around two disks he had taken apart. He also passed around an old disk drive, and we were able to look at how the drive translates information back and forth between the disk and the computer.

After leaving the "Computers for Beginners" talk, I had a chance to stop by the area where Heath products were being sold. HUGCON attendees were eagerly buying Z181 portable computers, specially priced at just $1,199. The Veritechnology folks were also selling ZF-171-42 portables for just $499.

Bionics for all

Later that afternoon, I was fortunate to attend a talk on bionics, given by Steve Greelish of Liberty Mutual Insurance Company. Greelish works in the biomedical engineering division of his company, and five of the eight members of his work group are HUG members. He said most of their engineering work is done on Heath/Zenith computers.

Greelish is currently working to develop better emulation of human limbs—elbow and wrist rotation, for instance. And he showed us their current replacements for the human arm.

He said, however, that even with the best supercomputers, it will not be possible to emulate the human hand because it is simply too complex.

Greelish said his office uses AutoCAD on an H/Z100 for engineering and design simulation. He also uses one H/Z248 for development with a microcontroller, and another '248 does on-screen simulation.

Desktop publishing

I must admit, I was a little envious of John Roach (of the Capital Heath Users' Group). I kept running into him in the vendor area, and I noticed he had his very own portable computer, which he was using to take notes for the HUGCON

article he was writing for CHUG's monthly newsletter. He is always such a pleasure to be around, though, that I put aside my envy and enjoyed his company instead.

Late in the afternoon, I attended John's lecture on "Desktop Publishing." He devoted a good portion of his time to talking about how Sextant Publishing Company produces its magazine, using the PagePlanner page-makeup system and a lot of elbow grease. He explained not only how *Sextant*'s technical editor John Walker uses WatchWord from S & K Technology to edit incoming articles, but also how John Gill and the rest of the production department plan and paste up the magazine.

Later, we were told how CHUG puts out its newsletter using PageMaker. It seems that putting together the newsletter is not an easy job, but PageMaker is certainly a helpful tool. For example, PageMaker's "toolbox" may be used for cropping and for drawing boxes, circles, and other shapes. PageMaker also supports Hewlett-Packard's plotting language. PageMaker is a good tool for combining graphics and text in a newsletter format.

This last lecture was an interesting and informative way to end the day. By the time it was over, those of us at the lecture had just enough time to go back to our hotel rooms and catch the end of the White Sox game before returning for Saturday night's banquet.

"What's New in Three-Two"

Sunday morning brought with it Bill Adney's discussion of "What's New in Three-Two" (MS-DOS version 3.2). Mr. Adney explained some changes represented in this new version of MS-DOS. The changes include: ten new commands; a new device driver; some new enhancements to older utilities; some changes in system performance with a hard disk; and some new Zenith-specific hard-disk commands. (Bill Adney's *FlipFast Guide to MS-DOS*, published in August 1987, covers these changes in detail.)

Brushing off the lint

As the conference began to wind down, Bob Gray of Graymatter Application Software had an "I-Don't-Want-To-Ship-It-Home Sale," and offered 20% discounts on all his modems. Graymatter offers a number of upgrades for Heath/Zenith computers at reasonable prices. Jim Buszkiewicz of the Heath Users' Group finished things off by giving away a number of last-minute door prizes.

After we packed up all of our belongings at the Sextant Publishing Company booth and left the vendor area, we noticed a bag full of lint hanging from one of the bulletin boards in the main hall. Next to the bag, there was a sign that read, "Genuine HUGCON floor lint—10 cents." Although some of us may have been tempted to get this one last souvenir of the last International HUGCON, the bag remained untouched. After a weekend of reckless spending, I guess nobody had 10 cents left.

Additional Information

The FlipFast Guide to Zenith/Heath MS-DOS, $24.95; add $2.50 shipping and handling per order.
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Cramolin Cleans Computer Contacts

Here's a solution for computer glitches.

Gerald G. Cramm

In my many years as a military technician, one of my most frequently performed and least desirable jobs is the maintenance of thousands of contacts connecting the various circuits in a piece of equipment. Maintaining contacts requires removing each printed wiring board; cleaning the contacts with a soft, Pink Pearl eraser; wiping the contacts with a clean cloth dipped in technical-grade alcohol; and re-installing the board when the contacts have dried.

The primary reason for this procedure is to prevent—or at least to slow—the formation of an insidious green fungus that grows on everything except hot ceramic surfaces. If left to itself, the fungus will eventually impede the signal flow, causing, among other things, unpredictable computer system crashes.

This cleaning also aids in spotting early problems with the system.

More often than not, while this disagreeable task is being done, a co-worker will say, "You know, at my last duty station we had this stuff that you could wipe onto an electrical contact that would clean the contacts and make the signals flow better!"

The solution revealed

Well, after all these years, I have discovered that there actually is a magic elixir that aids the conduction of electrical signals across contacts.

I have used it on my H89 and on many other computers for some time now. It is readily available to every frustrated computer user.

Its official name is "Cramolin." That trademark identifies an entire series of products developed by CAIG Laboratories, in Escondido, California. The products range from liquids to sprays to pastes, in various strengths depending on the specific application. And there are varieties of Cramolin specifically designed to clean excessively dirty contacts, preserve the contacts from further degradation, reduce contact resistance, and promote the passage of signals across electrical contacts.

I'm not trained as an electrical or chemical engineer, so I don't necessarily understand all of the properties attributed to Cramolin; but I can quote from Service Bulletin SB-1R put out by the company:

"Cramolin has the property of orienting its molecules on metal surfaces, which guarantees an electrical resistance which is low enough to give excellent contact transmission and high enough to avoid any short circuits.

"Cramolin has excellent migration characteristics. If a plug is coated with Cramolin and inserted into the socket, it will migrate to the socket's surface, cleaning it in a similar fashion. Insertion of the connectors will push the dissolved debris out of the way. . . ."

Cramolin Red

I have used only one of these many products on my H89 computer—Cramolin Red Liquid.

All I have to do is dip a Q-Tip into a small bottle of Cramolin Red, wipe it across the accessible pins for each of the many sets of contacts in my H89, and then swab off the excess with a dry Q-Tip. Reconnection of the two mating surfaces will transfer Cramolin to the otherwise inaccessible surface and promote conduction of the required signals.

I have not confined my use of Cramolin to sets of connector pins, either. The liquid works equally well between the contacts of integrated-circuit chips and the pins of their marginally adequate sockets on the terminal-logic and processor boards of my H89/90 computer. It also works on the connector pins for the serial and parallel peripherals, and I've even applied it to the connections on my disk drives.

The results have been extremely successful: previously unexplainable system "crashes" have been rendered nonexistent.

Every time I turn on my computer, it works without fault. Aside from taking the normal precautions, I haven't done anything else that I know of towards resolving these glitches. So, I can only reasonably attribute this new-found computer reliability to having used Cramolin.

It's not a panacea

It must be noted here, however, that I am a staunch advocate of the use of power-line protection. I do not consider power-line disturbances to be unexplainable occurrences.

You may not have installed surge suppressors and other common passive protection devices on the power line to your computer *and* to its peripherals. If so, start with those procedures first.

If power-line protection has been installed and unexplained system crashes still occur, my experience has proven that Cramolin is the answer to these problems.

But it works

I now have an H89 computer without glitches. I can edit an umpteen-thousand-word newsletter, or this article, with the calm feeling that it will not have to be saved every hundred words.

As a matter of fact, I have gotten so confident, that, on occasion, I have left the computer running with a disk inserted in the drive and gone out to eat dinner with the family—certain that my file and disk and system would be intact when I returned!

My computer works—all of the time. Does yours?

Ordering Information

Cramolin Red, 2 fluid ounces, $11.95;
$5 service charge if less than $50 order.
CAIG Laboratories, Inc.
1175-O Industrial Avenue
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Gerald G. Cramm has fought system crashes in his H8 and H89. (Any similarity between his name and the name of the product he discusses—"Cramolin"—is purely coincidental.)

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Finally, if a really nasty bug persists, put C-more, our source code debugger, to work. With C-more you can watch your program as it executes, single-step it, set simple or conditional breakpoints, test complex expressions, use variables as indexes into other variables, initialize and trace variables, examine CPU registers, display results with printf()-type options and much more. C-more can help you track down bugs in minutes rather than days.

The price for Eco-C88 is $99.95. And, for a limited time, we'll give you our C-more debugger at no extra charge.

Memory Options

Model	Code Size	Data Size
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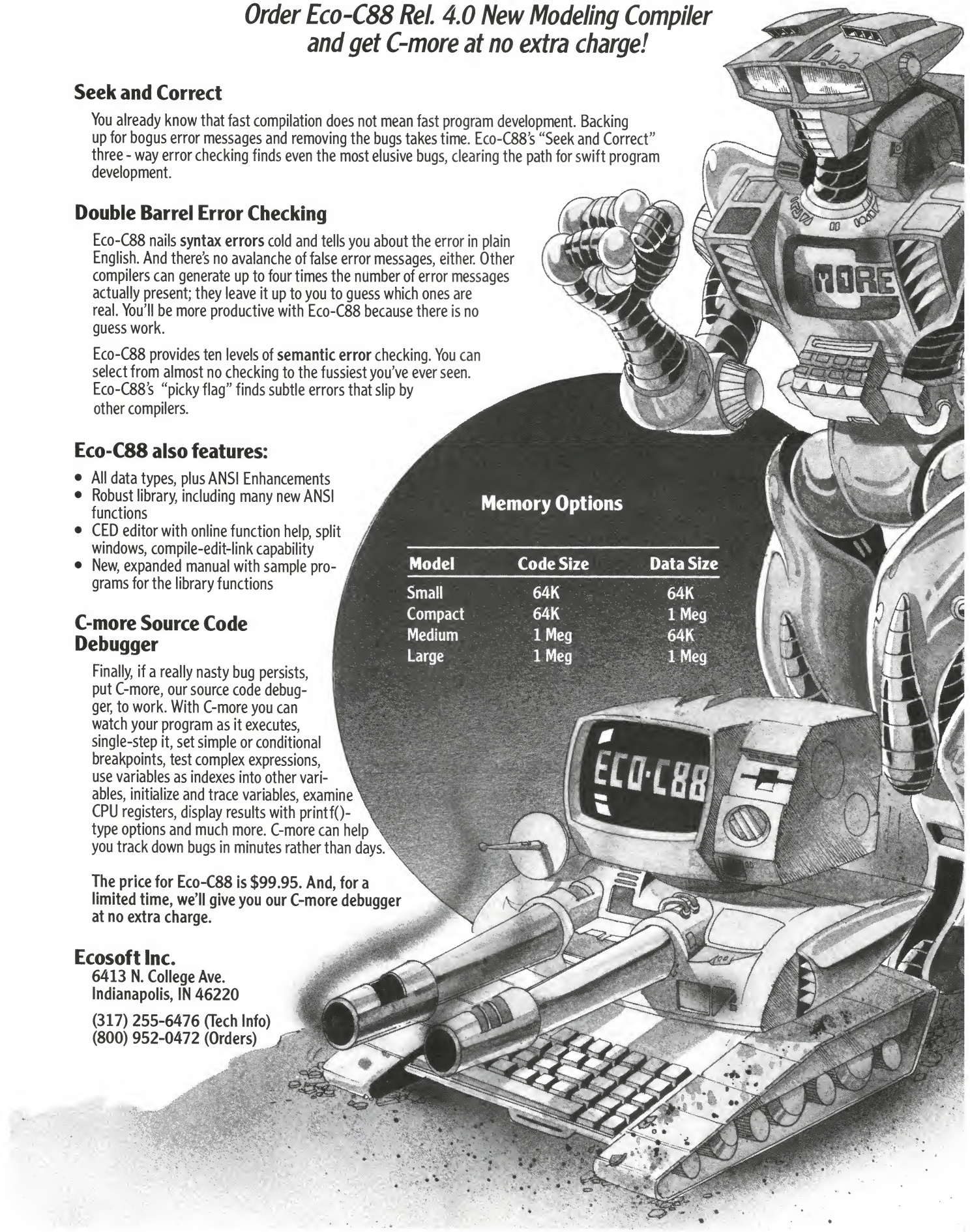
Compact	64K	1 Meg
Medium	1 Meg	64K
Large	1 Meg	1 Meg



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EDLIN: An MS-DOS Lifeboat

If you've got MS-DOS, you've got EDLIN. Here's how to use this simple line editor.

William M. Adney

EDLIN is the line editor supplied with the Microsoft Disk Operating System (MS-DOS). It's quite easy to learn. It *is* limited, but it can be extremely useful for small editing jobs for which the power of a word processor or programming editor is simply not needed.

I use EDLIN for editing nearly all my batch files, and for doing other small jobs such as changing the system-configuration file, CONFIG.SYS.

For many of you, however, perhaps the most important fact about EDLIN is simply that it should come with *any* version of MS-DOS, for *any* computer. Have you ever had to use someone else's computer, where you didn't have access to a familiar word processor? If so, it was probably a nuisance to perform even very simple tasks, such as creating a small text file or reading a file already on disk.

In such a situation, EDLIN can be your "lifeboat"—limited, but invaluable. And in this regard, EDLIN is well worth learning about just because it's so simple to use. Moreover, you'll be able to keep EDLIN handy without worrying that you may be wasting valuable space on disk: version 2, for instance, weighs in at just 8,080 bytes.

The information in this article applies to all Heath/Zenith computers that run MS-DOS—both the Z100 and the IBM compatibles. It also applies to virtually all versions of Heath/Zenith's MS-DOS—including the Zenith Disk Operating System (Z-DOS), Zenith's Z100 implementation of MS-DOS version 1. The information applies equally well to IBM's PC-DOS. (Some EDLIN subcommands were added in the release that came with MS-DOS 2; I'll indicate these as we go along.)

I tested the information in this article on my H100 and H248 systems. For the H100, I used Zenith's MS-DOS version 3.10 with IO.SYS 3.00. For the H248, I used Zenith's MS-DOS version 3.20 with BIOS (IBMBIO.COM) version 3.29.

In the previous issue of *Sextant*, I looked at the use of your computer's function keys for editing MS-DOS command lines. (See "Editing MS-DOS Command Lines—Easily" in *Sextant* #30, September-October 1987.) The F3 key, for instance, will copy to the screen the entire command line that MS-DOS last executed. F1 will step through the characters one by one. (See the previous article for a complete list of the function keys and their uses.)

> ***As you learn to use the function keys, you're also learning to use EDLIN.***

These keys let you edit MS-DOS's *command-line buffer*. In proper MS-DOS terminology, that's the *template*. The important point here is that, as you learn to use the function keys, you're also learning to use EDLIN. The function keys are EDLIN's substitute for the cursor controls in more sophisticated text editors.

Using EDLIN in ten minutes

To illustrate the use of EDLIN, let's create a simple batch file, START.BAT. It will consist of the following command lines:

```
DATE
TIME
```

To make things easy, create the file on the current drive. If we assume that you are in drive A:, you would enter the following command line:

```
EDLIN START.BAT
```

EDLIN will then inform you that you are creating a new file; following that, you will get the asterisk (*), or star prompt, as it is sometimes called.

The entire display is as follows:

```
A>EDLIN START.BAT
New file
*_
```

By itself at the left margin, the star (*) is EDLIN's command prompt. In the example above, I have shown the cursor position by means of the underline character.

Now let's create the file; type I (Insert subcommand), followed by a RETURN. Your display should look like this:

```
A>EDLIN START.BAT
New file
*I
     1:*_
```

The 1 followed by the colon is the line number. Lines are automatically numbered by EDLIN, and the colon is used as a separator. Following a line number, the asterisk (*) indicates that this is the current line number. (I'll discuss this below.) The cursor (as shown) is ready for input.

Now enter the DATE and TIME lines as shown above. If you make any mistakes, use the BACKSPACE key to erase characters, then type in the correct ones. Press RETURN at the end of each line. Your display should now look like the following:

```
A>EDLIN START.BAT
New file
*I
     1:*DATE
     2:*TIME
     3:*
```

If you wanted, you could keep on adding new lines of text. But we do not want to enter any data on line 3. To exit back to

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the EDLIN star prompt, all you need to do is press CTRL-C.

To review the input data, you can use the List subcommand: at the star prompt, type an L followed by a RETURN. This will display all the lines in your file, and show you their line numbers.

To save the data, type an E (End subcommand), and press RETURN. EDLIN will exit, the START.BAT file will be saved, and you will see the MS-DOS command prompt. If you followed these steps correctly, you should have seen the following:

```
A>EDLIN START.BAT
New file
*I
     1:*DATE
     2:*TIME
     3:*^C
*L
     1: DATE
     2: TIME
*E
A>_
```

That's all there is to using EDLIN to write a new file. Calling EDLIN START.BAT, we invoked EDLIN and directed it to open the START.BAT file on disk. Then the Insert (I) subcommand told EDLIN we wanted to create new lines of text. We added text to the file, then exited the Insert mode with CTRL-C, and reviewed the entire file with the List (L) subcommand. Then we used the End (E) subcommand both to write the file to disk and to exit EDLIN.

Now that you generally know how to create a file, we can look at some additional details of EDLIN and its subcommands.

Using the EDLIN command

You can invoke EDLIN with a command in the following form:

```
EDLIN [d:][\path]<FILENAME.EXT>
```

(Here, and in the other command lines I'll give, the square brackets indicate what is *optional*.)

Whenever you invoke the EDLIN command, you must include a file name on the command line. If you do not include a file name on the command line, then EDLIN will display the "File name must be specified" error message and return you to the MS-DOS prompt.

As with many commands, you can precede the file name with an optional drive letter (d:) and path name (\path).

MS-DOS version 3.2 also provides the optional /B switch, typed at the end of the command. This will allow you to edit binary files (.COM or .EXE files). (Among other things, specifying /B directs EDLIN to read CTRL-Z simply as an individual character, rather than treating it as the end-of-file marker.) I have not found that option to be at all useful, and it is recommended only for advanced users.

Limitations

After having said that EDLIN was easy, I should also point out that it *is* limited.

The above example shows you where EDLIN is most likely to come in handy: a very short job, one where you're not likely to make many errors, and where it isn't inconvenient just to backspace and retype to correct any mistakes you do make.

And if you're cramped for disk space, 8,080 bytes is a small price to pay for an "emergency" editor.

But once you move beyond those "quickie" jobs, you will come up against EDLIN's limitations. Basically, editing under EDLIN is going to be as convenient and as limited as writing a command line at the MS-DOS prompt.

Perhaps the most important limitation is that the cursor-control arrow keys cannot be used. (The left arrow will act just like the BACKSPACE, erasing characters as it moves.)

Not having the arrow keys means that we will need some other way to step through a line, and some other way to move up and down to the various lines within a file.

The limitations of EDLIN are not insurmountable, however. You might want to regard EDLIN as a sort of lifeboat: you won't want to take any ocean voyages with it; but it's nice to know it's there in case of an emergency.

Inserting text into an existing file

Let's return to the START.BAT file example and decide that we want to enter a PROMPT command in the form of:

```
PROMPT $P $Q$Q$G
```

This command will produce an MS-DOS command-line prompt consisting of the current drive letter, a space, two equal signs, and a greater-than sign. (If you want more information on PROMPT, you might look at my article "How to Use PROMPT on the '100 and '150." See *Sextant* #21, March-April 1986.)

Start EDLIN with the file name as usual, and your display should be:

```
A>EDLIN START.BAT
End of input file
*_
```

Because you are editing an existing file, EDLIN displays the message "End of input file". That means that EDLIN has loaded the contents of the entire file into memory.

List the file contents with the L subcommand, and your entire display should look like:

```
A>EDLIN START.BAT
End of input file
*L
     1:*DATE
     2: TIME
*_
```

Notice that EDLIN has displayed your file with an asterisk (*), or star, on line 1. As I said earlier, the star following a line number indicates the *current line number*. I will discuss how to use that in a minute, but first let's use a variation of the Insert (I) subcommand to insert the PROMPT command as line 3. At the EDLIN command prompt, simply enter 3I (insert line 3); your screen should then look like:

```
A>EDLIN START.BAT
End of input file
*L
     1:*DATE
     2: TIME
*3I
     3:*_
```

On line 3, now type the command line

```
PROMPT $P $Q$Q$G
```

and press RETURN. EDLIN will then display the next line number (line 4). Enter a CTRL-C to return to the EDLIN command prompt, and your screen should now look like:

```
A>EDLIN START.BAT
End of input file
*L
     1:*DATE
     2: TIME
*3I
     3:*PROMPT $P $Q$Q$G
     4:*^C
*_
```

Whenever you are about to exit back to the EDLIN command prompt, I recommend that you always use the List (L) subcommand so that you can see exactly where you are in the file.

What if you had wanted to put the PROMPT line *above* DATE or TIME? No problem—you could simply have typed 1I or 2I instead of 3I. That would *not* have typed over the original line. The lines after your new line would have been renumbered. This operation is usually called dynamic line numbering.

Editing a line

Now let's assume that you are not going to want the command prompt to display the equal signs ($Q parameter). You now need to edit line 3. To do so, all you need to do is enter 3 at the EDLIN command prompt.

If you did not enter the L subcommand, your display will now be:

```
A>EDLIN START.BAT
End of input file
*L
     1:*DATE
     2: TIME
*3I
     3:*PROMPT $P $Q$Q$G
     4:*^C
*3
     3:*PROMPT $P $Q$Q$G
     3:*_
```

Notice that line 3 appears twice. Typing that 3 took you to the beginning of line 3. EDLIN is waiting to see what you will do with the line.

To step through the line, use the F1 (copy one character) key. (You could figure out ways to use the other function keys, but F1 is the most straightforward.) Press the F1 key repeatedly until your cursor is positioned just *before* the first $Q parameter. Press the DEL key (F4 on the Z100) four times to skip the four characters QQ; then press F3 to copy out the rest of the line. Now press RETURN to go back to the EDLIN command prompt.

Here, things have worked much as if you were at the MS-DOS command line. If you had pressed F1 twice, and then hit RETURN, line 3 would have contained only those first two characters. EDLIN treats the line you are editing just as if it were the MS-DOS command line: it stores in the template only what is there when you finally type RETURN. If you had typed a RETURN at the star prompt at the very beginning of line 3, you would have erased the entire line.

After all that work, let's say we decide that we really don't want to add the PROMPT command to our file. All you have to do is enter Q (Quit subcommand) at the EDLIN command prompt and press RETURN. Because this will *not* save any changes you made during the edit session, EDLIN will display the "Abort edit (Y/N)?" message. If you type a Y and RETURN, EDLIN will exit to the MS-DOS command prompt; all changes made in that editing session will be lost. If you type an N, you will stay at the EDLIN star prompt with the file still active.

By the way, don't forget the difference between inserting a line and editing a line. Typing 3I at the star prompt, for example, allows you to insert a *new* line 3; 3 alone lets you edit the line that currently has that number.

At this point, you know enough to use EDLIN effectively. In this section, we covered how to edit an existing file; use line numbers to edit an existing line; insert a new line in a file; and abandon changes made to a file.

Notice above how we got around the lack of any cursor-control arrows.

To go up or down in a file, we have to give EDLIN a specific line number. That brings us to the very beginning of that line. To step through that line, we use the same function keys that we would use on the MS-DOS command line. The same is true if we had wanted to insert or delete some characters.

But what if you had overstepped the point where you wished to insert or delete characters?

There, we face one of EDLIN's limits. There is no equivalent to simply moving the cursor to the left. The left arrow and the BACKSPACE key will erase any new characters that you have typed in; RETURN will erase the undisplayed part of the line. Instead, you can hit ESC (SHIFT-F0 on the '100) to go back to the beginning of the line. (You could also use CTRL-C to abort the edit and go back to the star prompt; that way, though, you'd lose any new characters.)

If you have made changes to the line and wish to retain them, you have to copy out the rest of the line, hit RETURN, and press CTRL-C to go back to the star prompt. Then tell EDLIN the line number, and start all over again. (It's fortunate that EDLIN displays the line that you are about to edit.)

The current line number

Because EDLIN works with lines, it must maintain some kind of "line pointer" so that it can keep track of which line is being edited (i.e., the current line).

EDLIN displays an indicator—the asterisk (*)—so that you can identify the current line. As you will see, that can be very useful for some subcommands, since EDLIN always begins an operation (such as a Search) at the current line number, unless otherwise specified.

Even though EDLIN displays line numbers, they are *not* stored in the file. In fact, EDLIN always displays sequential line numbers regardless of the operation you perform (e.g., delete a line).

At EDLIN's star prompt, you can go to and edit any line in the file by typing the line number and pressing RETURN. You can edit the current line by typing a period (.) followed by a RETURN. And finally, you can edit the line following the current line by pressing RETURN alone.

Long lines

Before we go on to more complicated editing, a couple of general application notes are in order. First, the maximum line length allowed by EDLIN is 253 characters. Although the maximum is really 255, a carriage-return/line-feed sequence (two characters) is required for each line of text.

EDLIN is well worth learning about just because it's so simple to use.

On any of the Heath/Zenith IBM compatibles, if you input a line that would go past the right margin, you will find that the cursor will jump down to the line below. This "character-wrap" will not actually insert a carriage-return/line-feed pair, however. As far as EDLIN is concerned, you are still on the same line. You will find that you can enter up to 253 characters until you hear a beep of complaint from your computer; after that, no further characters will be accepted until you move to the next line.

If you use EDLIN to read a file that has long lines, they'll be displayed broken on the screen. One point to keep in mind is that you will be able to use the List command to *view* lines much longer than 253 characters. But if you try to *edit* the line with the function keys, the line will automatically be truncated to 253 characters.

For some reason, the character-wrap capability does not work properly with EDLIN on the Z100. You can view and edit long lines, but to do so you have to provide the necessary line breaks on the display by using the LINE FEED key (or CTRL-J). (As with the line breaks on an IBM compatible, the line breaks you insert here will affect only the display, not the actual text in your file.) Continue to press F1 (or any of the other editing keys) until the entire line is edited.

Control characters

Despite what some of the documentation may lead you to believe, you *can* include some control characters (e.g., CTRL-G for a "beep") in a file edited with EDLIN. In some versions of EDLIN, just type the control character; in others, you may need to precede your desired control character with a CTRL-V. The "V" character *must* be uppercase. (My preferred technique for editing batch files is to always lock the keyboard in capital letters, so I do not have to remember to use the SHIFT key when I want to enter control characters.)

So, if you wanted to have your computer beep at a prompt in a batch file, you would simply enter: CTRL-V, CTRL-G. That is, hold down the control key (CTRL), and press V followed by G.

However, I have found that this technique does not work with a number of control characters. The most notable are CTRL-P and CTRL-N, both of which MS-DOS uses for printer-echo control. EDLIN will simply ignore you when you type these and several other control characters.

Additional ways to examine a file

To easily use a line editor such as EDLIN, it is important to know various subcommands that you can use to see the contents of a file. Although we have already used the List (L) subcommand in its most basic form, the most general List subcommand syntax is:

[begin-n][,last-n]L

If you wish to see a specific range of lines, you can use the optional beginning line number (begin-n) and the last line number (last-n) in the subcommand. One important point about the List subcommand is that its use does *not* change the current line number.

When you want to scroll through a large file, you will probably want to use the Page (P) subcommand. Although the Page subcommand was introduced in MS-DOS version 2, it was not included in the Zenith EDLIN documentation until version 3.2.

The general syntax for the P subcommand is:

[n]P

or

[begin-n][,last-n]P

As with the List subcommand, if you wish to see a specific range of lines, you can use the optional beginning line number (begin-n) and the last line number (last-n) in the subcommand.

The difference between the subcommands is that the Page subcommand *does*

EDLIN Command Summary

EDLIN [d:][\path]FILENAME.EXT[/B]

Append (nA)
[n]A

Copy (nC)
,,dest-nC
or
[begin-n],[last-n],dest-n[,count]C

Delete (nD)
[n]D
or
[begin-n],last-nD

Edit line (n)
n

End (E)
E

Insert (I)
[n]I

List text (nL)
[begin-n][,last-n]L

Move (nM)
,,dest-nM
or
[begin-n],[last-n],dest-nM

Page (P)
[n]P
or
[begin-n][,last-n]P

Quit (Q)
Q

Replace (R)
[begin-n][,last-n][?]R oldstring CTRL-Z newstring

Search (S)
[begin-n][,last-n][?]S oldstring

Transfer (T)
[dest-n]T[d:]FILENAME.EXT

Write (nW)
[n]W

Table 1. Subcommands in EDLIN, the line editor supplied with MS-DOS. Items in square brackets are optional. Except in the EDLIN command line itself, lowercase items (such as begin-n) indicate number references.

change the current line number. Also, the current line indicator (*) is always the last line displayed on the screen.

Block subcommands

Like most editors, EDLIN has the standard Copy, Delete, and Move subcommands. (As with Page, these three subcommands were introduced in MS-DOS version 2; but Copy and Move were not included in the Zenith documentation until version 3.2.)

The Delete subcommand allows you to delete a single line or a range of lines. The general syntax for the Delete subcommand is:

[n]D

or

[begin-n],last-nD

Note that when you want to delete a range of lines, the optional beginning line number (begin-n) defaults to the current line number if one is not specified. The comma preceding the last line number (last-n) is always required.

The difference in use between Copy and Move is reflected in their names: with both, a series of already existing lines will be inserted into a new location; with Copy, the lines at the original location are left intact; with Move, the lines are deleted from the original location.

Syntax for the Copy and Move subcommands is quite similar. The general syntax for the Copy subcommand is:

,,dest-nC

or

[begin-n],[last-n],dest-n[,count]C

Similarly, the general syntax for the Move subcommand is:

,,dest-nM

or

[begin-n],[last-n],dest-nM

You can use the first general form of the Copy and Move subcommands to copy or move the current line number to a destination line number (dest-n). In the second general form of each subcommand, the range to be copied or moved can be specified just as with the Delete subcommand.

You may have noticed that the Copy subcommand also has a count option. If a number is not specified for count, the default specifies that the subcommand copy the line (or range of lines) only once. If you enter a number for count, then the Copy subcommand will copy the line or range of lines that number of times—a useful feature if you want to create a large file quickly.

The Search subcommand

EDLIN's Search and Replace subcommands can also be used to make changes in a file.

The general syntax for the Search subcommand is:

[begin-n][,last-n][?]S oldstring

The simplest form of the Search subcommand is S oldstring. The Search subcommand will begin the search at the current line (indicated by the *) and search for the first occurrence of oldstring; it will search until it is found or until the end of the file is reached, whichever comes first.

If a match is found, the line containing oldstring will be displayed, and you will be back at EDLIN's star prompt. The line containing oldstring will be the current line. If you want, you can edit it.

(Note, by the way, that Search is *case sensitive*. You must specify upper- and lowercase characters. Searching for "Press" will not show you any instances of "press".)

After you have once entered the entire Search subcommand for oldstring, you can just type an S to Search for the next occurrence of oldstring.

The optional question mark (?) is used to provide an "O.K.?" prompt after the display of each line containing oldstring.

If you wish, you can specify a range of lines (i.e., begin-n to last-n) to be searched. Generally, I want to search the entire file for something, regardless of where I am in the file. So, I might use the following subcommand:

1,#S oldstring

That subcommand form allows me to search the entire file for whatever the contents of oldstring are.

But what is that strange # sign doing in the middle of the subcommand? That is an EDLIN "shorthand" symbol that represents a line number larger than the last one in the file—in effect, the entire file. You could accomplish the same thing by entering a line number larger than any in the file, say 999. I use the # only because it requires fewer keystrokes.

If I knew that oldstring appeared a number of times in the file, my preferred form for using the Search subcommand would be:

1,#?S oldstring

Using the question mark allows me to control whether the Search will continue. As the Search progresses and an exact match is found, the line containing the match will be displayed with the "O.K.?" prompt on the following line. If I enter a Y, the Search stops; if I enter an N, the Search continues to look for the next exact match of oldstring.

For example, let's say that I was looking for a particular occurrence of ECHO in a batch file. I can use the following subcommand: 1,#?SECHO. I type an N response to the "O.K.?" prompt until I find the exact line I am looking for; then I type a Y to abort the Search. Once you get the hang of doing this, it really is pretty easy.

EDLIN is useful for small tasks that you want to do quickly.

The Replace subcommand

The Replace subcommand is quite similar to Search. The general form of the subcommand is:

[begin-n][,last-n][?]R oldstring
CTRL-Z newstring

The Replace subcommand will replace an occurrence of oldstring with newstring. Notice that the text strings are separated by a CTRL-Z—and that the only spaces on the command line are any that may appear within oldstring or newstring. I have shown this subcommand in its most general form—but on the IBM compatibles, you can use the F6 key instead of CTRL-Z.

Aside from replacing, the Replace subcommand works exactly like the Search subcommand. If a range of lines (i.e., begin-n to last-n) is not specified, the Replace subcommand will begin the search (and replace) at the current line (indicated by the *), and will search for the first occurrence of oldstring until found or until the end of the file is reached, whichever comes first. Then the oldstring text will be replaced by the newstring text.

Just as it is used in the Search subcommand, the optional question mark (?) is used for requesting a prompt during the replace process, and for functions. The use of the question-mark prompt is particularly recommended for the Replace subcommand, because it gives you complete control of the process.

After you have once entered the entire

Replace subcommand with the oldstring and newstring text, you can just type an R to search for the next occurrence of oldstring and replace it with newstring.

The Transfer subcommand

There are occasions when it is useful to be able to merge a file on disk with the one you are working on. For example, you may already have another batch file that contains the basic skeleton or other subcommands that you want to include in a new batch file. The Transfer subcommand allows you to read that file into your current one quite easily.

The general form of the Transfer subcommand is:

[dest-n]T[d:]<FILENAME.EXT>

If the destination line number (dest-n) is not specified, the contents of the specified file (<FILENAME.EXT>) are transferred (i.e., merged) into your current file at the current line number indicated by the *. When the destination line number *is* specified, the contents of the specified file are transferred to the current file beginning at that line number.

Although you can specify an optional drive letter for the file, the Transfer subcommand still does not allow you to specify a path. If you try to specify a path, EDLIN won't recognize it as such, and will display a "File not found" error message.

EDLIN subcommands—a summary

I have not attempted to cover every subcommand variation or all of the options available in the EDLIN subcommands. The purpose of this article was to give you an introduction to EDLIN, its subcommands, and its capabilities. This editor is not intended to replace your word processor, because EDLIN simply does not have the features that most people want in a word processor.

Like most software, it takes a little practice to become used to the capabilities and features of EDLIN. I admit it's not the best editor around, but it is useful for small tasks that you want to do quickly.

Table 1 contains a complete list of all EDLIN subcommands. You will find that I have not previously mentioned the use of the Append or Write subcommands in this article.

These two subcommands allow you to edit files that are larger than the available memory. Append takes a specified number of lines from the disk file and puts them in memory for editing. Write takes a specified range of lines from memory and puts them into the disk file. My reason for not covering them is that they are needed only for large files.

Even though EDLIN may be easy to use for small files, it gets to be very clumsy and cumbersome if you are trying to edit a large file. My personal preference is to limit the use of EDLIN to files of 100 lines or fewer. Even so, I will still use a full-featured editor such as WatchWord for small files that require a lot of detailed editing.

To get the most out of EDLIN, I suggest using it for editing small files such as batch files and CONFIG.SYS. You will probably find that you'll want to use your standard editor for most other chores.

An EDLIN kink (and fix)

Have you ever run a batch file and found that you had an extra blank command prompt displayed? In the example of the first START.BAT file, you might see something like the following:

```
A>DATE
.
A>TIME
.
A>
A>_
```

The fourth display line is where your cursor finally stops, but the third line is blank. What happened?

It's a trivial problem, but it stems from the very nature of EDLIN as a *line* editor. EDLIN closes a file only *after* you have given a carriage return to end the last line. In an EDLIN file, the end-of-file marker (CTRL-Z) will always be preceded by a carriage return. But MS-DOS will treat the CTRL-Z in the same way as it does a carriage return, so that it can execute the last line in a file, even if there's no terminal carriage return. So, we have a superfluous carriage return—which produces the duplicated MS-DOS prompt.

Agreed, this is a trivial problem, but there is an easy way to fix it.

After you have finished making changes to a batch file with EDLIN, enter a # sign to get to the end of the file. Then enter the List (L) subcommand to see the last line. Edit the last line by typing in the appropriate line number. Press F3 (to copy out the entire line), then press F6 (CTRL-Z on the Z100). Finally, save the file with the E subcommand. Because the CTRL-Z character is used to indicate the end of an ASCII text file, we have simply inserted an end of file at the correct place. That will eliminate the blank command prompt line.

Any questions?

I am always glad to answer questions about my articles if you will enclose a stamped, self-addressed envelope (preferably a #10 business envelope) with your letter. And I am always interested in hearing about subjects for articles that you would like to see in *Sextant*.

William M. Adney
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The Eight-Bit World

Walter J. Janowski

This time, let's take a look at some current software offerings for CP/M. Recently, I've received packages from four companies. These six packages contain over 25 programs; the prices range from $12 to $45.

It's going to be a busy column, so let's get right to business.

User areas

I received several packages from Logic Associates in Chicago, Illinois, and I have to admit I'm impressed. One program is an answer to my recent prayers.

But first, a little background on user areas.

CP/M allows you to organize your disks by "user areas." This lets you create separate file areas on your diskettes not unlike the subdirectories in the Microsoft Disk Operating System (MS-DOS).

If you've never explored user areas, try this simple experiment. Boot up a CP/M disk on your computer. At the A> prompt, type DIR for a directory. Now type USER 1 and a RETURN. Do another DIR, and this time you will probably be told that there are no files. It's just as if the disk were blank. In reality, you have just logged into an empty user area, which we'll call A1:. Under normal circumstances, you are always working in A0:, that is, drive A:, user area 0.

The command USER itself will report the currently logged user area. If you have logged into a user area (A1:, for example), the command USER will respond appropriately (as with USER 1). Otherwise, the A> prompt remains unchanged, giving you no indication of the user area into which you are logged.

The drawback of user areas is their inability to recognize other user areas. For example, let's say you are logged into area A1: and wish to run PIE.COM, which is located in area A0:. Entering the command PIE will simply get you PIE?. CP/M's infamous "?" error message has just indicated it is unable to locate the program you requested.

CP/M gives you no convenient way to access files and programs in other user areas. (DIR USER 1, for instance, or DIR A1:, or anything else you might think of, just won't work.) Of the usual CP/M commands, only PIP can deal with a user area other than the current one. Just add the G (get) parameter in square brackets.

```
PIP B:=FILENAME.EXT[G2]
```

would copy FILENAME.EXT from user area 2. But PIP can only *read* a file from a different user area; it can't *write* a file to any user area other than the one you're logged into.

So, how do you get PIP itself written to your user area? Call up PIP, then hit RETURN at its star (*) prompt. Then switch to your desired user area; PIP will still be loaded in memory. Then type SAVE 29 PIP.COM; this will move the first 29 pages (29 x 256 bytes) in memory to a file to be named PIP.COM. (My thanks, by the way, to Bill Adney and his *FlipFast Guide* to CP/M-80/85 for that explanation of how to get PIP into a user area so you can copy things into it.)

Well, you can understand why CP/M's user areas have never been too popular.

However, you might have installed ZCPR, the replacement for CP/M's standard console command processor (CCP). ZCPR makes things easier by allowing you to define a *search path* through which CP/M will look for a requested program.

In the above example, you could have set up your system so that CP/M would check in area A0: if a program wasn't found in the currently logged drive and user area. Having a search path would allow all your commonly used programs and utilities to be stored in A0:; you would be able to access them from any other user areas you may have designated for other applications. This becomes particularly useful with a hard disk.

In addition, ZCPR changes the A> prompt to indicate the user area. If you were logged into drive A:, user area 4, for example, the prompt would be changed to A4>. This really helps keep things straight.

But ZCPR still leaves one problem unsolved. Most CP/M applications were not written to recognize user areas. If you were logged into A0:, executed PIE from there, and tried to edit a file in area A3:, PIE would be unable to locate the file.

You are also lost if your program uses overlay files—as do the "big three": WordStar, SuperCalc, and dBASE II. These programs run by executing one main .COM file, but some of their specific functions are stored in additional overlay files. To conserve memory space, these files are called into memory only when needed.

The problem is that these overlay files won't be named .COM files. ZCPR will search its path to find an executable .COM file, but it will not search for overlays. This operation is performed within the program itself, not as a function of CP/M. (Note: Newer versions of ZCPR are correcting this limitation of the search-path feature.)

Anyway, this general subject of user areas and search paths has been one of my

pet concerns lately. I have been doing a lot of work with dBASE II and with QuickCode, Fox and Geller's dBASE II code generator. Both of these programs are dependent on overlay operations. Also, QuickCode generates a number of small program modules for dBASE. User areas would be an ideal way to keep several different dBASE applications separated within one diskette.

DiskGuise

Well, Logic Associates came to my rescue with DiskGuise (DG). DG is a multifunction utility just *two kilobytes* in size. (It's so tiny that its elegance of operation almost brings tears to my eyes when I compare it with some of those monolithic MS-DOS utilities.)

One of DG's features is the ability to rename a user area as a disk drive. If PIE cannot recognize area A5:, for example, A5: can be renamed D: (or any drive name of your choice). Now PIE thinks it is dealing with a new physical drive—D:—rather than with another user area of A:.

DG also allows you to create more than one additional name or "alias" for one drive. Say, for example, you had a one-drive system, and an application program was configured to look for two drives. Then you could assign the alias B: to drive A:. The application would then think you had a drive B:, but all B: information would still be written to A:.

Standard CP/M normally allows you to access 16 user areas per drive, and ZCPR increases that number to 32. DG allows you to access up to 255 user areas.

CP/M's STAT utility allows you to set a drive to read-only status to prevent unintended alteration of files, but that status will revert to read/write whenever a warm boot (CTRL-C) occurs. For added security, DG lets you assign a read-only status that will survive a CTRL-C.

And last, but certainly not least, is my dream come true. DG lets you define what Logic Associates refers to as an "extended public drive." One drive is designated such that whenever *any* file is missing from the currently logged drive, the public drive is automatically searched—even when the call has been made from within another program. This means that a program that uses overlays can be placed on A0: and executed while you are logged onto A4:, for example.

When executed, DG tacks itself onto the CP/M image in memory, and occupies about 1.75K of additional memory space whenever it is loaded. This may be a problem in programs that utilize every last byte of memory, but most allow enough leeway. In fact, I have yet to find one program that will not run with DG installed—although QuickCode hangs up with a "not enough memory" error if I have both DG and Write-Hand-Man resident simultaneously.

You invoke the drive changes on the command line that calls DG; the commands are very straightforward. If DG is executed with no additional parameters, it identifies itself and offers a help menu. (On-line help in less than 2K!)

The program recognizes actual physical drives A: through P:, and allows definition of "virtual" drives (user-area aliases) A: through P:. Virtual drive P: is the public drive.

For example, to define area A6: as drive C:, the command line would be DG C=A6. Specifying A0: as the public drive would be DG P=A0. Multiple assignments may be entered on one command line, such as DG P=A0 B=A4: D=B1. . ., etc. Once you enter this, DG provides a display of the assignments you have just set and returns to the A> prompt.

DG has performed flawlessly; after the first time I used it, it became one of those utilities I don't know how I ever lived without. If you frequently use programs requiring overlays, have a single-drive system and wish to run programs requiring multiple drives, or have a hard disk with a directory system getting way out of control, DiskGuise is a steal at $32.

COLUMNS

Another entry from Logic Associates is COLUMNS. The documentation refers to COLUMNS as a "column processor," able to process columns of text in much the same way a word processor manipulates individual words. If you're looking to produce a newsletter or other multi-column document, check this out before you spring for an MS-DOS machine and one of those fancy (and expensive) desktop-publishing programs.

Ordinarily, if you were attempting to produce a multi-column document, you would need to format your text into one long column with your word processor, print it, and then use scissors and paste to assemble your finished document. COLUMNS will allow you to take that text file and manipulate page size, margins, and number of columns to produce a new file formatted to your liking.

COLUMNS accepts standard ASCII text as input and produces standard ASCII text as output. So, your input file can be created with any editor, and your output file can be manipulated by any word processor for "fine tuning."

COLUMNS also gives you the ability to reverse the process; that is, if you have created a multi-column document, you can return it to its original, single-column format.

The documentation is clear and well written. Many examples demonstrate the options available. Output may be directed to the screen for previewing or to the printer for immediate use, or stored to a disk file. On-line help is also available.

The only feature I found lacking in COLUMNS was the ability to reformat the line length of the input file. In other words, if you want the columns of your output file to be 25 characters wide, you must first use your text editor to format the entire input file to a 25-character

width. COLUMNS will then process the file, assembling pages and creating page breaks where necessary.

True, COLUMNS will appeal to a fairly limited market. But for those requiring this capability, I found COLUMNS able to do the job well, and at a reasonable price—$29.

TutorI/O

Speaking of limited appeal, another product from Logic Associates is TutorI/O. TutorI/O is a utility designed for assembly language programmers and those interested in studying the input/output (I/O) operations of CP/M.

I'm getting in a little over my head here, but let's see if I can't explain this.

If you're interested in studying the inner workings of CP/M, you already know that the Digital Research CP/M manuals are cryptic at best. Many books have been written about CP/M. But another way to study the workings of the file functions of CP/M would be to monitor the central processing unit (CPU) itself and watch its reactions as CP/M functions are performed. TutorI/O can also show you the result codes that will be returned to your program, and it can monitor any changes made in a file's directory entries.

TutorI/O provides you with a monitor to the innards of CP/M while it's working.

TutorI/O provides you with a sort of monitor to the innards of CP/M while it's working. TutorI/O is executed with DDT or another debugging tool of your choice. Used together, they will allow you to perform the various functions related to CP/M's basic disk operating system (BDOS). TutorI/O lets you do this through a menu of single-character commands. After each function is performed, all the resulting status codes and results are displayed on the screen for analysis.

If I've lost you at this point, don't worry. If your interest in the inner workings of CP/M doesn't carry you far enough to understand what this means, you probably won't need a copy of TutorI/O anyway. If any of this makes sense to you, however, I hope I've deciphered enough of TutorI/O's operations to convey how useful this package is.

The program and documentation assume that the user has a fairly solid grasp of CP/M and assembly language programming with reference to disk I/O operations. It's definitely not a package for beginners. But if you've got that burning desire to learn CP/M inside and out, TutorI/O should help make your efforts a lot less painful—and the price is just $29.

Others from Logic Associates

Logic Associates also markets some other interesting utilities for CP/M, including SUPERMIT (a SUBMIT-like batch processor that incorporates a BASIC-like command structure), VERSBASE (a utility that will rename and number successive revisions of files, giving them all a .BAK extension), and MEGABACK (a backup utility for hard-disk users).

Logic Associates seems committed to continue supporting the CP/M marketplace. In fact, most of their packages were developed on an IMSAI 8080 computer with Morrow's Disk Jockey double-density controller, two Shugart S800 drives, and a Televideo 912C console.

Write for a copy of their catalogue/newsletter. It contains articles, hints, and a list of their latest products.

Derby CP/M utilities

William S. Derby of Livermore, California, saw that CP/M lacked a few of the features he found handy in MS-DOS; he developed the Derby CP/M Utilities to correct the situation. This set of four programs is a compact collection of utilities written in assembly language for speed and size advantages.

The first program, SUB, is a replacement for CP/M's SUBMIT program. It emulates SUBMIT in most of its functions. So, you can make up a text file (.SUB extension) of CP/M command lines, and CP/M can execute them as a batch operation. However, SUB provides additional features not found in CP/M's original.

Most notably, SUB allows you to combine several submit files into one master file (to be called SUB.BAT). This is particularly helpful if you have a number of small .SUB files; they'll take up a lot less disk space in one file. Whenever you call one of the individual .SUB files, it will be invoked from the master file.

SUB also provides an interactive mode that will let you input lines from the keyboard. All in all, SUB represents a much more powerful utility than SUBMIT.

Second is SD. SD can be thought of as a replacement for CP/M's STAT utility as well as a replacement for the DIR command. SD lists the current file directory sorted alphabetically; it provides additional information on each file, such as file size, number of unused sectors, and read/write status. A number of command-line switches are available to select how much file information is displayed, and to change the Read/Write/System status of individual files.

CMP is a file-comparison utility. CMP will compare two files, either ASCII or binary, and report on and identify differences between the two. This can be useful in determining if a file has been changed from a previous copy, or for verifying data integrity between transferred files.

COPY is a program designed to make the command line for copying CP/M files similar to the format used by MS-DOS's

COPY command. So, you can use COPY OLDFILE.EXT NEWFILE.EXT rather than PIP NEWFILE.EXT = OLDFILE.EXT. COPY will interpret your command line, process it, and feed it to PIP in the format PIP expects.

COPY is probably most useful for users who continually need to switch between CP/M and MS-DOS. Now, they won't have to worry about keeping command structures straight. Also, COPY does add a little more ease of operation to day-to-day copying.

The Derby Utilities are a well-written collection, but it will be up to you to determine whether or not they would be useful in your particular application. However, at a price of only $12, it's hard to go wrong. They're available in all 48-track-per-inch, 5¼" disk formats.

CompuMagic Utility Package

CompuMagic, Inc., of Severn, Maryland, still distributes several software packages for CP/M. One package that's chock-full of utilities for CP/M is the CompuMagic Utility Package. The package consists of a collection of several small but useful utilities roughly divided into three categories.

The first group contains file-management programs. CMCOPY is a multi-function file copy program similar to PIP, but with several more options. CMCOPY can perform multiple file copying while querying the user for confirmation of file name, overwrite status, copy verification, etc. It also provides an option for setting to zero the eighth bit of each character (e.g., converting a WordStar document file to an ASCII file).

COMPARE will compare the contents of two files and report on their similarity in size or content. Unfortunately, the only information given is whether or not the files are the same. COMPARE offers no specifics about the actual nature of any difference.

DS (DoubleSpace) simply takes an ASCII text file and converts it to a double-spaced document.

ERASE is the same as CP/M's ERA command, but it allows multiple entries per command line, and also gives a query-before-performing option. Likewise, RENAME is the same as CP/M's REN command, but it adds options similar to those in ERASE.

SORT is an ASCII-text sorting utility that will sort the lines of an ASCII file in ascending or descending alphabetical order. WC (WordCount) does exactly what it says—it counts the number of words in an ASCII file.

Most of the file utilities respond to command-line switches that control query mode, prompt mode, user areas, overwrite status, etc. A special install program is provided to modify the default settings of each of the file-management programs.

The second set contains directory utilities. MDIR and MDIRS produce sorted directory listings either with or without file-size information. DISKDIF will compare two disks and report on files present on one disk but not on the other. DIRBAK lists only files with a .BAK extension. DIRSPACE and UDIR give a standard directory, and also report on the number of directory entries per disk. (UDIR reports on all user areas.)

The directory programs also respond to the same switches as the file-management series, and a similar install program is provided.

The first two sets of utilities are fairly trivial, and are often less powerful than similar programs in the public domain. But there are a few programs of interest in the third set, the Special Utilities.

One simple but possibly useful offering is A.COM. While logged onto another disk drive, have you ever tried to type "A:" and found yourself accidentally typing "A;" or just "A" instead? Well, A.COM will catch that error and correct it, converting it to "A:".

CMAUTO creates an executable program that will run another executable program. In that regard, it's like the feature of

If you don't have a modem, CompuMagic's utilities are worth investigating.

CP/M's CONFIGUR program that lets you specify one program for automatic execution on bootup. (You can give CONFIGUR a program created by CMAUTO, so a disk can be made to automatically boot and run the CMAUTO program of your choice.) But CMAUTO programs can be called at any time.

One of the advantages of CMAUTO is that you can feed CP/M a full command line (116 characters)—not just the program name and an argument, which is all CONFIGUR will take. Also, you can include user-area specifications. So, if you don't have a suitable search-path capability, you could use CMAUTO programs to call programs from other user areas.

Another utility is MINIERA, which is just what you'd expect—a smaller, stripped-down erase utility. (It's like CP/M's ERA except that it can be called from within WordStar.) And the programs R/O and R/W set, respectively, a file's read-only and read/write status.

Finally, SCREEN will capture all output to the console and copy it to a disk file, much the way CTRL-P copies console data to the printer. SCREEN will capture every byte sent to the console, whether printable or not.

SEARCH

Another program from CompuMagic is SEARCH. SEARCH is a very flexible ASCII search utility. It allows you to specify an

ASCII string and one or more file names. The files will be searched for each occurrence of the specified string. Many options and wildcard naming functions are available, both for file names and for the text strings.

The CompuMagic Utility Package sells for $45, while SEARCH is $30. The packages may be purchased together for $60.

The programs all perform as promised. And most are very small and fast in operation. However, I have one reservation about these packages from CompuMagic. Many of the programs are not unique; in many cases, similar or better utilities are available free in the public domain.

With the widespread availability of quality public domain software and the fragility of the CP/M marketplace, I feel that CompuMagic should seriously consider a price reduction. By today's standards of software quality, these packages seem overpriced. Still, if you don't have a modem or other access to a source of public domain software, CompuMagic is worth investigating as a source of useful utilities.

FTL Modula-2

By the way, Workman & Associates has released its version of the Modula-2 programming language. FTL Modula-2 is available for CP/M machines—including a version in Heath/Zenith 5¼" soft-sector format.

Workman's promotional material states that FTL Modula-2 is a one-pass compiler written by Dave Moore of Australia. It was written in Z80 assembly code and includes an integral editor. Source code for the editor is also available.

It looks like a great package; unfortunately, though, I don't feel I have the programming experience necessary to do it justice for a full review.

The Organizer—an update

Tim McNeal of McNeal Software (formerly McNeal Audio) in Warsaw, Indiana, has announced that he is releasing his disk cataloging program, The Organizer, into the public domain. He has uploaded the software to GEnie for distribution, and he will provide copies directly for a $5 copying fee.

Thanks for the public domain support, Tim.

Ordering Information

DiskGuise, $32; COLUMNS, $29; TutorI/O, $29.
Logic Associates
1433 West Thome Avenue
Chicago, IL 60660
312/274-0531

Utility Package, $45; SEARCH, $30; both, $60. (No charge for UPS ground; add $2 for UPS C.O.D., $5 for foreign orders. Specify CP/M disk format.)
CompuMagic, Inc.
P.O. Box 437
Severn, MD 21144
301/969-8068

GEnie information: 800/638-9636, ext. 21; free on-line demo: 800/638-8369; half-duplex, 300 or 1200 baud; after connection, enter HHH<RETURN>. At the U# prompt, enter 5JM11999, GENIE<RETURN>.

The FlipFast Guide to Zenith/Heath CP/M-80/85, $7.95.
Sextant Publishing Company
Dept. S31
716 E Street, S.E.
Washington, DC 20003

The Derby Utilities, $12.
William S. Derby
P.O. Box 2041
Livermore, CA 94550

FTL Modula-2, $49.95.
Workman & Associates
112 Marion Avenue
Pasadena, CA 91106
818/796-4401

The Organizer, copying fee $5.
McNeal Software
R3-8A Lake Sharon Drive
P.O. Box 904
Warsaw, IN 46580
219/269-3793 △

Opening Windows on Your '100

Microsoft Windows is available for the Z100. Was it worth waiting for?

Robert W. Rasch

At long last—Microsoft Windows is available for the H/Z100!

When discussed in *Sextant* three and a half years ago, Windows for the Z100 seemed to be "just around the corner." (See "Windows Opens the Door to Compatibility" by Frederick Zimmerman, in *Sextant* #10, May-June 1984.) Well, it has been a little longer than I expected, but now it's here.

What is Windows?

When you first use it, Windows can seem much like an ordinary "pop-up" or "desktop" utility, such as Barry Watzman's Perks (or Borland International's SideKick on the Z150 and other IBM compatibles). When run, Windows reserves an area of memory for itself, and loads itself into that space. After it is loaded, you can run an ordinary applications program. Windows will be memory-resident all the time, in the "background," while your applications program is running in the "foreground."

Windows, however, is not really a pop-up utility. It is a utility that allows you to jump between applications. Windows is an operating-system enhancement; it puts your applications into memory and organizes them for quick access.

In effect, it has the potential to turn full-featured, stand-alone word processors, data bases, spreadsheets, etc., into components of one very powerful integrated program that will let you switch among them with just a few keystrokes.

(Windows is compatible with some currently available memory-resident utilities, if they are loaded before running Windows. But it could also substitute for most pop-up utilities.)

Running one of Windows' sub-programs as your application can give you a good idea of its full potential. Windows comes with utilities such as a notepad, a calculator, a clock, and an appointment calendar.

Choose the notepad, for example, and use it as your word processor. Then call the calculator; it will cover your notepad text. Or you can have it occupy a window covering just a part of the screen, with much of your notepad text still showing. As you do your calculations, you can extract information from the notepad by means of the Windows clipboard. When you return to your notepad text, it will be just as you left it; you can then "import" your calculator results into it.

Windows provides an easy method for running your applications. It includes drop-down menus and indicates each possible application by a small picture suitable to the choice. (The icons are quite nice; for instance, the picture of the clock, although it is tiny, has hands that move.) Windows gives you the choice of using your keyboard, a mouse, or both.

Being able to switch among multiple applications will spoil you.

That is what Windows looks like at first glance: a flexible desktop utility with menus and icons—in fact, that is how I will be treating it here. And, at $99, Windows is not terribly high priced for "just" a desktop utility. But for an idea of Windows' full potential, you may want to look at the comments accompanying this article.

The basics

Windows comes on five 5¼" disks; the manual is a 6½" x 8½" paperback book, entitled the *Microsoft Windows User's Guide and the Desktop Applications User's Guide.*

Windows requires a computer capable of running version 2 or later of the Microsoft Disk Operating System (MS-DOS). You need two double-sided disk drives or a hard disk. (It is best with a hard disk.) You also need at least 256 kilobytes of memory; 512K is recommended.

You don't need a mouse, but it comes in handy. I've used Windows with the Microsoft Mouse, which needs to be plugged into either the modem port or the parallel printer port (with a special cable).

How Windows behaves

Windows is menu driven, and you choose among icons. With a mouse, you point your way through a menu and click the mouse at your choice. Without a mouse, you can use the arrow keys to scroll through a menu, and use RETURN to execute your choice.

Pressing the FAST REPEAT key and the spacebar simultaneously will provide you with the basic menu of operations for the current application. The menu for that application will be at the top of the screen, showing you the titles of its subsections. Over the notepad, for instance, "File," "Edit," and "Search" appear—these are the submenus pertinent to the notepad's operation. Once the basic menu appears, you can sweep through the various submenus with the right and left arrow keys. Hit RETURN and your choice is executed.

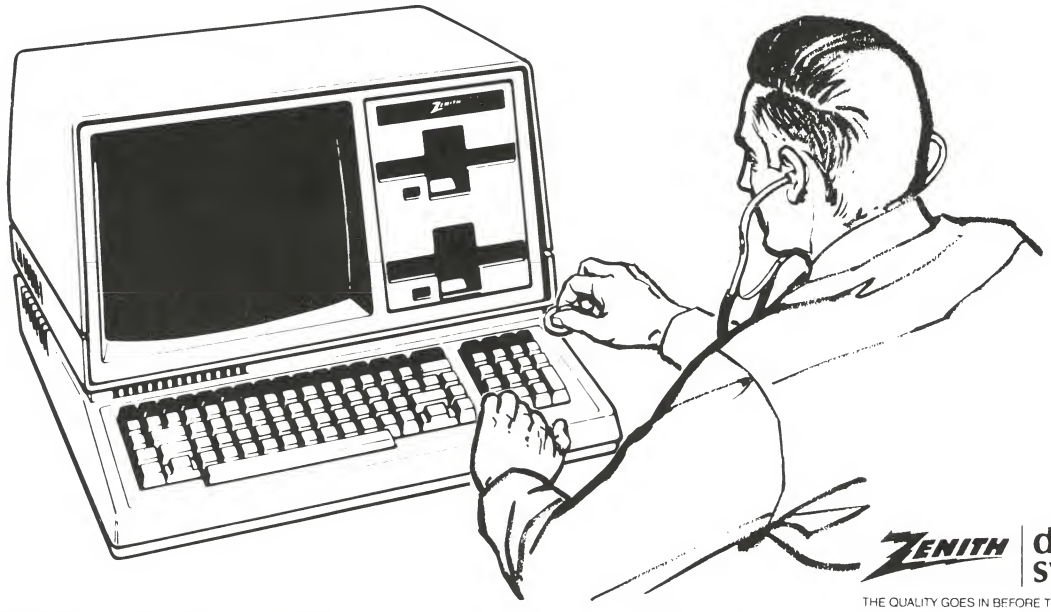
Windows makes FAST REPEAT-spacebar equivalent to moving the mouse through a series of icons so that you can choose which program you will be in. Under Windows, the FAST REPEAT key on the Z100 is equivalent to the Alt key on an IBM compatible. Labels are supplied for the keys that will be remapped during the installation of Windows.

The '100's DELETE key serves as the Num Lock key (to shift the numeric keypad). The BACKSPACE key is used to delete.

Windows doesn't seem to place any fixed limit on how many applications can be simultaneously stored in memory. (If you exceed your memory limit, Windows can swap elements back and forth between memory and disk; this can slow

Robert W. Rasch lives in Johnson City, Tennessee. His last article in Sextant, *in the November-December 1986 issue, discussed how to write computer simulations in MBASIC.*

Alive and Well.



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down operations considerably, however.) Concerning the number of windows on the screen at the same time, the practical limit is simply that you would want them to be large enough to display a reasonable amount of text or data.

So, you might put the calculator, the notepad, and the clock display on the screen all at the same time. The clock hands will move while you import calculations into your current text; at the same time, the spooler can be printing a document. After inserting your calculations, you might have a "peek" at your calendar and incorporate the data on one of your appointments into the current text.

You might have the clock and the notepad on the screen and decide to "zoom" to your calendar to set the alarm to ring at a particular time. Zoom is a toggle switch that makes any application occupy the entire screen for your immediate use. After the alarm is set, a zoom will take the screen back to the way things were before the first zoom; in this case, it will restore both the clock and the notepad file.

After a group of applications has been loaded, zooming an application onto the whole screen is swift and handy. The loaded applications themselves work very quickly and efficiently, particularly if you load your largest applications first.

Windows will prompt you to put your applications disk into the A: drive as it is needed. You can use a clean data disk in drive A: to store any file that you create.

Using the menus

Menus in Windows are neatly organized on the screen. The top line of each window contains the title line, consisting of the name of the application (and a file name, if applicable).

When multiple applications have been loaded, the background of the title line reflects which application is currently active. The name will be in normal video—light letters on a dark background. The others will have a light background. So, you might be typing in notepad, with the calculator in another area of the screen. Just point to the calculator's title line. Click, and you have shifted to the calculator, and the title line has changed accordingly.

Using the keyboard, you can type Alt-Tab to step through the loaded applications, whether they're showing in windows or as icons at the bottom of the screen. Each title line and icon will be highlighted in order. When the desired application is highlighted, you select it by typing Alt-spacebar; the first menu for that application will then appear. The subheadings of the menu are titled in the second line of the active window. After Alt-spacebar, a right or left arrow will produce a submenu for each of those headings.

To select from a menu, you can type the first letter of the desired command, or you can scroll through the choices with the up or down arrow, then press RETURN to execute the command. To get out of the menu display, press the ESCape key.

Once you get the hang of it, using the menus becomes a series of logical and

The Promise of Microsoft Windows

Windows is intended to provide a standard graphics environment. In principle, it is possible to produce a version of Windows for *any* MS-DOS machine. Each version of Windows will take care of a machine's particular hardware. Then, programmers can write software to run under Windows; the same version of software that runs on a Z100 should run on a '150.

To the extent that Windows becomes popular, therefore, the Z100 gains access to software written for the wider market.

Integration

MS-DOS was designed to run just one program at a time. But wouldn't it be nice if you could keep your word processor active while you grabbed data from a spreadsheet? Then you could plug the data into a report.

There are a number of programs—called integrated packages—designed to do just that. But they do so only with *their* specially designed word processor, *their* spreadsheet, etc. Most of the time, those products are not as good as their stand-alone competition.

Windows, however, is intended to let you run your favorite word processor with your favorite data base, for example. You shouldn't have to worry that they weren't designed to work together. Windows should take care of that.

Well, does it?

Standard applications

It is easy to infer from the Windows documentation that most ordinary MS-DOS programs—"standard applications"—should run under Windows.

One limitation mentioned is that many such programs won't be able to share the screen with one another. But you wouldn't have to actually exit the program and save your work before switching between programs. So, doing without the multiple display windows isn't much of a limitation.

The manual warns you, though, that with *some* standard applications, you may need to save your work before switching out of them. That's more limiting, but at least other loaded programs shouldn't be affected—any data in memory should still be intact.

Unfortunately, programs written for the Z100 may be optimized for very specific hardware details. It's hard for the designers of Windows to predict everything a program might possibly do. And when your program does the unpredicted, all bets are off. It may crash, leaving everything else unaffected; or it may crash Windows, as well.

There is only one way to be confident that a standard application will run properly under Windows: *try it*!

The future?

Windows was first announced in November of 1983. In microcomputing, that's a long time ago. And yet Windows has still not taken a firm hold. Initially, it was plagued by delays in production. The result is that there has never been the avalanche of Windows-specific software that some people expected.

But some software *is* being specifically written to run under Windows. This software may enable Z100 users to move into areas where their "incompatibility" problems have been most notable: advanced desktop publishing, for instance.

Aldus PageMaker, the popular Macintosh program, is available in a Windows version. Micrografx of Richardson, Texas, offers a number of graphics programs for Windows. Another company moving into Windows is Palantir; this is a company already familiar to some of you because they have long offered their word processor in Heath/Zenith-specific versions.

John Walker

Aldus
411 1st Avenue South, Suite 200
Seattle, WA 98104
206/622-5500

Micrografx
1820 North Greenville Avenue
Richardson, TX 75081
214/234-1769

The Palantir Corporation
2500 Augustine Drive
Santa Clara, CA 95054
408/986-8006

easily remembered operations. You find yourself getting what you want without having to think about it.

Windows application programs

The following programs come with Windows: CALC.EXE (25K), CALENDAR.EXE (37K), CARDFILE.EXE (37K), CLIPBRD.EXE (10K), CLOCK.EXE (8K), CONTROL.EXE (52K), NOTEPAD.EXE (19K), TERMINAL.EXE (47K), and REVERSI.EXE (15K), a game.

The documentation mentions two other files, WRITE.EXE and the PIF editor (PIFEDIT.EXE), whose functions are not so obvious.

In my copy of Windows, I found PIFEDIT.EXE buried away in the PIF subdirectory on my FONTS disk. The .PIF files provide program information to Windows about applications that you wish to run while in Windows. Although it is not altogether clear what that information is and how it works, PIFEDIT provides for editing or creating such files.

WRITE.EXE is a word processor you purchase separately.

The notepad

The notepad is not really a word processor, but it *is* convenient. It's good enough to write and print letters, and I have written portions of manuscripts with it. It does word wrapping, and produces files in ordinary ASCII format. If I am in a hurry, I write with the notepad and later transfer the files to WordStar for proper printer formatting. (Passing them through the Heath Users' Group's WSCON.COM program will quickly put them in WordStar format.)

The notepad cannot underline, superscript, subscript, or justify, nor can it do boldface. You will need a word processor to do those operations.

You can scroll the screen forward and backward a page at a time. You can move to the end of a line with a single keystroke. Cursor control is through the arrow keys.

A few problems

I've run into two problems in printing. (Your printer may behave differently.)

When writing text files that are to be printed, I've found that it's important to add a blank line or two at the end of the file; in this way, the printhead returns to the left margin when the printing is done. But there seems to be a bug here: sometimes the extra lines are ignored—leaving the printhead in the last character position. That's where the next line of print will start, unless I turn my printer off and then on again.

I also run into a problem when sending three or more tabs in a row. It misinterprets them.

For example, the lines
Tab Tab Tab Tab Firstname Lastname
Tab Tab Tab Tab First address line
will not format with an equal left margin unless there is copy to be printed both

before and after the lines with the tab indentations. Without any copy following, the tabs will just be ignored. However, if the tabs are replaced with spaces, it will print correctly.

A minor problem is that, so far, I have not found a way to set text margins narrower than the notepad window. So, I move another application to the screen, leaving the notepad in a smaller window. Then the notepad's word-wrap function can reformat the text within the narrower margins.

The clock is a good companion application with which to perform this function. You then have both a moving clock and the notepad file that you are working with. If Windows' operations are sluggish, it is an interesting diversion to keep the clock in the corner of your eye and watch it stop each time you perform some action in the notepad, then catch up when the action is done. (This has made me a clock watcher, though.)

The calendar

The calendar is particularly interesting, because it allows you to jump far into the future, a month at a time, to schedule an appointment. (Moving through the calendar a month at a time sounds slow, and it can be irritating when you're first learning how to do it. With practice, though, it's quite fast.)

The calendar will ring a bell at an appointed time; I find this a most useful feature. I tend to lose contact with the world while writing, and I completely forget about pending appointments. The alarm keeps me on schedule.

The calendar will print out a set of appointments, ignoring times and dates that have no appointments on them. Exiting the calendar involves pointing with a mouse or pressing a key.

The cardfile

The cardfile is a neatly constructed data base utility. It displays a data base as a series of cards stacked in whatever order you choose.

The cardfile entries (in whole or in part) can be printed to a file, then manipulated with a text editor, such as WordStar.

The calculator

The calculator looks like a pocket calculator; you point to the keys on the screen and click them with a mouse. If you don't have a mouse, you type in the numbers with the number keys or with the shifted keypad.

In my copy of Windows, a bug shows up when I depress the M and + keys together (to store a value in memory). This results in a flash of automatic repeats of that value. The repeats are ignored in any calculations, but they're a nuisance. (I attempted to eliminate the repeats by sending an escape sequence to the terminal; this, however, was undone by Windows' initialization routines.)

A problem in printing

You might find that your printer doesn't work after you follow the setup directions. You might also find that the tutorial in the manual doesn't cover the details of printing out a file.

Searching through the menus reveals a print command—which may not work.

When I invoked that command, an announcement flashed on the screen saying that the file had been transferred to the spooler. But my Diablo sat silently and did nothing! No notification, no warnings, no hung computer, just nothing happened. It was as if the printing had been successfully completed.

The manual has sections on using a text editor to change WIN.INI. (This file contains specifications for a number of system settings, including the port that will be automatically assigned to a given printer driver.) However, the changes described there did not work for me. When I restarted the system after editing WIN.INI, the printer still would not work.

The problem? The Diablo drivers that come with Windows are not appropriate to my Diablo 630; the TTY driver is the one to use. But that won't work, either, unless you also use Windows' Control application; among other things, this program lets you make appropriate communication settings for printers and modems. (MS-DOS's CONFIGUR utility is not the way to govern serial or parallel communication while in Windows.) After you set things up with Control, you can send the output to a file as well as to a printer.

Reading the manual, you might conclude that all of this is automatic, but the first initialization is not automatic. Once made, however, the settings remain a permanent part of the system, unless you want to change to a different printer.

Accessing MS-DOS commands

It is possible to format data disks and create or change disk directories while in Windows. While Windows' directory function will give you just a list of file names, you can get the full details with the "Get Info" command from within Windows.

However, it is also possible to revert to MS-DOS applications while within Windows. Thus, if you want, you can look at the disk-drive directory; you can get all of the directory information in the form that you are familiar with.

You can access MS-DOS commands from within Windows by running MS-DOS's command processor (COMMAND.COM) just as if it were any other program. With a two-drive system, the Windows System Disk could be in drive B:. Insert your regular MS-DOS system disk into drive A: and log onto that drive with CTRL-A. Then call COMMAND. COMMAND will be running under Windows, but it will take over the whole screen; no other windows can be displayed.

You could, if you wished, run a variety

of applications programs via COMMAND.COM. They operate sluggishly in this manner, however, and I have experienced sudden system crashes while doing this.

Some applications are "safe," and others are not. In my experience, GW-BASIC programs work fine; some text editors (other than the Windows notepad) may not.

Speed problems

Operations under Windows *can* be sluggish. This is mostly associated with how you have loaded all the applications you intend to use.

At the start of a session, it is most helpful to load a series of applications from Windows' Executive (main menu). The Executive shows you a disk directory, then it's simply a matter of moving to the program name in the directory and hitting SHIFT-ENTER. The program will be loaded without your having run it. As soon as programs are loaded, they will appear at the bottom of the screen as icons. The system can switch back and forth between them with alacrity, and they zoom with ease.

If you wanted, you could just tell the Windows Executive to load an application when you first needed it during a session. Depending on what applications you are using, however, that could make Windows incredibly slow. (Can you believe minutes between striking a key and seeing the character appear on the screen? This happened to me only once, but it did happen.)

Windows goes much faster if the largest application (in kilobytes) is loaded first. You can load and run one application from the MS-DOS command line that invokes Windows. My largest application file is about 5K. This is RWR.CAL, a calendar file that keeps records of past dates, as well as my schedule for the future.

So I boot up, then type WIN RWR.CAL. Loading both Windows and the data file takes about a minute and a half. My calendar is then active, and I might load the clock, notepad, and perhaps the calculator or the cardfile. Then we are off and running.

If you haven't loaded the print spooler, you'll have to wait for it to be loaded before printing starts. Subsequent printouts take much less time. Again, if it's speed that you want, load all the applications at the start of your Windows session.

Drive accesses are slow, too

Windows is slow when reading from or writing to floppy disks; it is probably much better with a hard drive. I find that it is certainly more convenient with a memory-disk drive: my two-drive system functions as a three-drive computer.

I use the RAM disk that comes with the MS-DOS 2 Programmer's Utility Pack, and set it for a size of 192K. (I have an H/Z100 with 704K of memory; as noted above, 512K is recommended for optimum performance of Windows.) I also set WIN.INI (the initialization file) so that it sets the RAM disk (I:) as the "swapping disk." This means that temporary files can be written to and from the RAM disk, with all the speed it provides.

Applications can be moved to the RAM disk by copying them there either before or after Windows is initialized.

Spoiling yourself

The utilities that come with Windows are not intended to compete with stand-alone programs. Nonetheless, I think you'll find them quite useful. Among them, I found the calendar and cardfile utilities to be quite well implemented.

What I dislike most is that it takes so long to initialize Windows using floppy-disk drives.

But being able to switch among multiple applications will spoil you; you'll miss that capability when outside of Windows.

One thing is certain, though: You'll view computing in a different light—just by opening some windows, you might say.

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Use Your '150's Unused Memory

The Z150 has enough unused RAM to hold a bigger keyboard buffer and some assembly language software.

David D. Clark

You've probably come up against the old rule: Applications will expand to use all available memory. It really is true. In this article and in a sequel, I'll show you how to write programs that use a chunk of the Z150's random-access memory (RAM) not normally accessible to the Microsoft Disk Operating System (MS-DOS).

The scratchpad

As you probably know, the Z150 has its monitor routines and a large part of its basic input/output system (BIOS) in read-only memory (ROM). Some of the routines in ROM require RAM as a scratchpad area. That area of RAM takes up 16K and begins at address F000:0000. (The SI (System Information) program that comes with the Norton Utilities will show you the scratchpad's location.)

The surprising thing is that only a small fraction of that 16K of memory is used for anything. Zenith's *Programmer's Reference Manual* (TM-150) gave me my first hint that this extra RAM could be used for something other than a scratchpad area for the ROM routines. The chapter about the keyboard presents a small program that uses part of the scratchpad RAM to increase the size of the keyboard type-ahead buffer to 4K.

My own experiments indicate that less than 1K of the scratchpad area is used by the BIOS or monitor routines. To find out what was going on there, I wrote a program that "takes a picture" of the contents of the scratchpad area and stores it on disk. I would take a picture, do some processing, take another picture, and so on. Then I compared the "snapshots" of memory stored on disk. I did the tests while running MS-DOS 2.11 and 3.10. After running lots of applications and doing lots of comparisons, I found that the only changes were in the lowest 1K of the scratchpad RAM.

That leaves 15K of unused space. Now, 15K is not all that much by MS-DOS standards. But it is large enough to hold some useful programs. Small RAM-resident programs—such as the keyboard buffer, a screen saver, a screen clock, or a program that displays the status of the keyboard's Caps Lock and Num Lck keys—are perfect examples of the types of programs that could be put in the unused memory.

> ***Writing programs to run in the scratchpad is very much like writing memory-resident programs.***

In this article and in its sequel, I'll discuss how to write programs that load into and run from the scratchpad memory.

A word of caution first, though. The use of the scratchpad memory is not well documented. It may happen that someday Zenith will decide to use more of the scratchpad area, or change its size, or move it to a different location. Undocumented features have a habit of changing from one product to the next without notice.

Writing programs to run in the scratchpad is very much like writing memory-resident programs. In this article, we will rework the keyboard-buffer program. We can familiarize ourselves with using the new memory area without becoming bogged down in details such as code relocation. With the keyboard-buffer program we will write, no executable code is moved into the scratchpad memory. (Code relocation comes next time.)

Expanding the keyboard buffer

MS-DOS maintains a 16-character type-ahead buffer in low memory. The routine that handles the keyboard-action interrupt uses this buffer to store keystrokes until a program or the operating system can use them. For example, because of some action that must be executed, a program may not be able to completely respond to one keystroke before the next is entered. A word processor, say, might be automatically reformatting a large paragraph as you type. If you enter characters faster than the program can respond, they will be stored in the keyboard buffer until the program can accept them.

An entry in the buffer contains the main byte (often just the ASCII character) and an auxiliary byte (usually the keyboard scan code, to indicate the key location that actually produced the character); so, each keystroke occupies two bytes in the buffer.

The buffer is maintained as a circular list, with a pointer to the head of the list and another pointer to the tail. Copies of these pointers are stored in low memory. The two-byte word at 0040:001A points to the head of the list, while the word at 0040:001C points to the tail.

In addition, the Zenith ROM routines keep a copy of the number of the memory segment in which the type-ahead buffer is stored, the offset to its starting point in that segment, and the offset of the last byte in the buffer.

These values happen to be stored in the part of the scratchpad memory that the ROM *does* use. The buffer's segment is stored in the word at F000:00C8. The starting offset is stored at F000:00CA,

David D. Clark lives in Bristol, Indiana. He has worked as a technical editor, and has been published in Byte *magazine and* Dr. Dobb's Journal.

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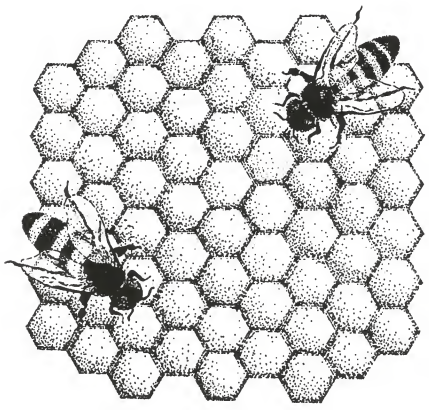

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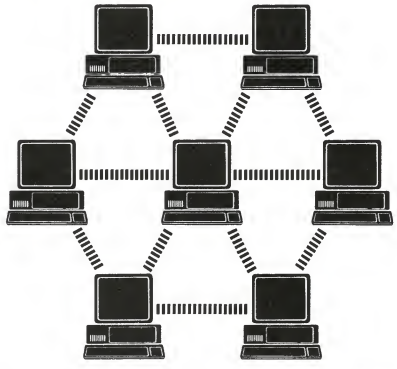

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while the word at F000:00CC points to the last byte in the buffer. To create a larger type-ahead buffer, we just need to reserve some space somewhere and reset all of the pointers accordingly.

Programming for the scratchpad memory

Because the scratchpad area is outside of the memory managed by MS-DOS, there are some difficulties in using programming tools designed for MS-DOS applications. We will work primarily with assembly language, because it is the only language that allows us enough flexibility to do what we want.

A program written to run in the scratchpad memory can be broken down into two basic parts: the part that will actually run in the scratchpad area, and the code that installs it there. The part of the program that does the installation can be written just like any other program designed to run under MS-DOS.

Before we discuss the installation, however, we must look at what we will install.

Designing a program header

When a program is loaded into memory, MS-DOS creates a special header called the Program Segment Prefix, or simply PSP. The PSP contains lots of information that the running program and operating system can make use of. This information includes such items as any arguments given on the command line (names of files to be DELeted, say), addresses of error-handling and exit routines, and so on. (See Table 1 for a summary of the information contained in the standard PSP.)

For the programs designed to execute in scratchpad memory, we will create a header much simpler than the standard PSP. All of the information in our header will be used to help in the installation of programs in scratchpad memory. The header will be set up so that the programs may be installed anywhere in the scratchpad RAM, and in any order. (See Table 2 for the contents of our header.)

The first field in the header is what I call a signature word. It is an easily recognized and relatively unlikely pair of bytes. I chose D6 C9 (hexadecimal), because they do not correspond to any 8086 instructions or ordinary ASCII-text characters. MS-DOS uses signatures in a similar way; for instance, they are used to mark the beginning of the area in ROM that controls some add-on boards. In our keyboard-buffer program, we will use a signature word to detect the presence of a previously installed program.

The second field consists of eight bytes containing the name of the program in ordinary ASCII. Our installation code can check all the program names in scratchpad RAM to see if the program it is attempting to install is already present. Using an ASCII string for the name makes debugging easier. Searching memory for a readable string is a lot easier than looking for an arbitrary series of hexadecimal values.

The third field in the header is a word reserved for the address of the boundary of the free memory—which is the first *paragraph* of scratchpad memory after the program. A memory paragraph has an address evenly divisible by 16 (10 hex); a paragraph is the smallest piece of memory that can be referenced by a segment register. (It will be handy to be able to reference the free memory by a single register value.)

The pointer to the paragraph after the end of the program will point either to free memory or to the beginning of the next program in a chain of installed programs. If it points to a word containing a signature byte, then another program is already installed there. That program's header will provide the installation code with yet another pointer to possible free memory.

Small RAM-resident programs are the types of programs that could be put in the unused memory.

The search continues until the word pointed at contains no signature word. An area of memory without a header can be considered free for use. The pointer to the free memory area will then allow the installing routine to determine if there is enough space left to install the new program.

The fourth part of the header is a variable-length list. Each element in the list is five bytes long, and corresponds to one interrupt intercepted by the scratchpad program. The first byte contains the interrupt number. The remaining four bytes hold the interrupt vector in effect before the program was installed. The installation part of the program is responsible for filling in these locations.

These interrupt numbers and vectors follow one another until an interrupt number of 0 is encountered, indicating the end of the list. (I hope no one wants to take over interrupt 0. That is the "Divide by 0" interrupt.)

The list of intercepted interrupts can be used for "chaining" interrupt calls and

Offset	Field
00 - 01	Location of interrupt 20h (program termination)
02 - 03	Memory limit (first address above end of RAM)
04	Reserved; usually 0
05 - 09	Alternate entry point (for CP/M compatibility)
0A - 0D	Location of interrupt 22h (terminate-handler)
0E - 11	CTRL-C handler address
16 - 2B	Used by MS-DOS
2C - 2D	Segment address of system-environment data
50 - 52	Function-request dispatcher
5C - 64	First FCB parameter
6C - 7F	Second FCB parameter
80 - FF	Default disk transfer address
80	Parameter length
81 - FF	Parameters

Table 1. Contents of the standard program-segment prefix (PSP). Created by MS-DOS when a program is located, the PSP is stored in memory immediately below the program, and serves as a means by which MS-DOS and the program can exchange information about important system parameters, etc. The author established a much shorter header to serve a similar purpose for his scratchpad-RAM programs. (See Table 2.)

Offset	Field
00 - 01	Signature word
02 - 09	Program name
10 - 11	First free-memory address
12 - ??	List of interrupts to be intercepted

Table 2. Contents of the header for a scratchpad-RAM program. While containing much less information, this header serves much the same purposes as a standard MS-DOS PSP. (See Table 1.)

for later removing a program. The keyboard buffer alteration described here does not take over any interrupts. (Next time, we'll do that.)

The header makes up just about all of the interesting part of the new keyboard buffer. The remainder is just space reserved for buffering the keyboard input.

Find free memory

The keyboard-buffer program is KEYBBUFR.ASM, given in Listing 1. Installation is the important part of this keyboard-buffer program. And one of the essential parts of this process is finding out exactly where to install the new buffer. This is where the design of the header becomes significant.

Listing 2 is FINDFREE.ASM, a small routine INCLUDEd in all of my scratchpad programs. This is the source code for the FindFreeMem procedure, which is used to find the correct location to install the program. Its operation is described in the pseudo-code fragment in Listing 3.

If a previously installed copy of the program is not found, the routine returns with the carry flag cleared. The carry flag is set if the program is already installed. Either way, the DS register contains a pointer to the relevant memory paragraph. DS points to the available memory, or to the previously installed copy of the program.

This program will let you establish an expanded keyboard buffer in the scratchpad RAM.

KEYBBUFR.ASM

Now is the time to start filling in the details. Let's examine KEYBBUFR.ASM (Listing 1) piece by piece.

The program starts with a list of equates. KeysToBuffer determines the size of the new buffer. In this case, it will be large enough to hold 100 keystrokes. That should be enough for just about anybody.

The value of FirstFree is the paragraph address of the first location within the scratchpad RAM where programs may be loaded. (The actual first possible location is lower. FirstFree is 1K after the start of the RAM.)

LastFree is the paragraph boundary of the first memory area *after* the scratchpad RAM. (In my system, there is no memory there.) These two values determine the location and size of memory available in which to install scratchpad programs.

Listing 1. KEYBBUFR.ASM, source code for the program that lets you establish an expanded keyboard buffer in the RAM ordinarily used only as a scratchpad for routines stored in the Z150's ROM. (Note that KEYBBUFR will INCLUDE the FINDFREE.ASM source code found in Listing 2. This provides the code that actually determines where in scratchpad RAM the expanded keyboard buffer may be placed.)

```
        PAGE    60,132
;
; KEYBBUFR.ASM -- create a large keyboard type-ahead buffer
; in the unused portion of MFM-150 scratch pad memory.
;
; David D. Clark
; 1 January 1987
;

OldExit         EQU     0               ; DOS 1.xx exit function
GetDos          EQU     30h             ; get DOS version number
Terminate       EQU     4ch             ; DOS Terminate Process

SigWord         EQU     0d6c9h          ; signature word
SigLength       EQU     8               ; length of signature string
KeysToBuffer    EQU     100             ; number of keystrokes to buffer
BufSize         EQU     (2*KeysToBuffer); size of required buffer
FirstFree       EQU     0f040h          ; first free memory paragraph
LastFree        EQU     0f400h          ; last free memory paragraph

cr              EQU     0dh             ; carriage return
lf              EQU     0ah             ; line feed

;
; Macros
;

CStoDS          macro
                mov     ax,cs
                mov     ds,ax
                endm

DosCall         macro
                int     21h
                endm

; TermProc terminates a process with the code passed as
; an argument.

TermProc        macro   RetVal
                mov     ax,((Terminate SHL 8) OR RetVal)
                DosCall
                endm

; DispStr displays the string whose offset is passed as an argument.

DispStr         macro   String
                mov     dx,OFFSET String
                mov     ah,9
                DosCall
                endm

; TypeStr allocates memory containing the string passed as
; argument, then displays it.  A cr/lf pair is appended to
; the string.

TypeStr         macro   String
                local   a,b
                jmp     SHORT b         ; bypass data definition
a               db      String,cr,lf,'$'
&b&:            DispStr a
                endm

;
; Segment definitions
;

MonDat          EQU     0F000H          ; Z-100 PC monitor data segment

MonSeg          SEGMENT AT MonDat
        KeyBuffSegment  EQU     0c8h    ; buffer segment
        KeyBuffStart    EQU     0cah    ; start offset of buffer
        KeyBuffEnd      EQU     0cch    ; end offset of buffer
MonSeg          ENDS

BiosDat         EQU     040H            ; the BIOS system RAM area

BiosSeg         SEGMENT AT BiosDat      ; compatible data segment
        KeyHeadPtr      EQU     1ah     ; buffer head pointer
        KeyTailPtr      EQU     1ch     ; buffer tail pointer
BiosSeg         ENDS

Only            SEGMENT
```

→

```
        ASSUME CS:Only, DS:Only, ES:Only, SS:Nothing

                ORG     100h

KeyBuf          PROC    FAR

CodeStart:      JMP     Install

;
; The header for the keyboard buffer in scratchpad memory.
;

HeaderStart     EQU     $

Header:
Sig             DW      SigWord         ; the signature word
SigString       DB      'KEYBBUFR'      ; unique application name
FreePtr         DW      ?               ; pointer to next free memory
IntList         DB      0               ; no interrupts replaced

HeaderEnd       EQU     $
HeaderLen       EQU     (HeaderEnd - HeaderStart)
SigStringOffset EQU     (SigString - HeaderStart)
FreePtrOffset   EQU     (FreePtr   - HeaderStart)
BufStart        EQU     HeaderLen + 1           ; offset of first byte in bufr
BufEnd          EQU     BufStart + BufSize      ; offset of last byte in buffer

;
; Install -- install the memory resident code.  First, check
; for needed DOS version.  Next, call FindFreeMem to check the
; scratchpad memory to see if we are already installed.  If so,
; print an error message and exit.  If not already installed,
; check the amount of room left in memory.  If insufficient, print
; message and exit.  Otherwise, if everything looks OK, copy
; the header to the location in the scratchpad and reset the
; BIOS and ROM monitor pointers to the new buffer.
;

Install:

        ; Print out a sign on message.

                TypeStr 'KeyBufr -- Keyboard Buffer. Ver. 1.0'

        ; Check for proper DOS version.  Need 2.0 or above.

CheckDos:
                MOV     AH,GetDos
                DosCall
                CMP     AL,2            ; above or below 2.0?
                JNB     CheckMem

        ; Wrong version of DOS.  Display message and terminate
        ; using function 0 of INT 21h (since DOS 1.xx does not
        ; support function 4ch, terminate process).

WrongDos:
                TypeStr 'Requires DOS 2.0 or higher.'
                MOV     AH,OldExit
                DosCall

        ; Check to see if we are already installed and, if not,
        ; is there enough room to install the buffer.  FindFreeMem
        ; trashes DS, so remember to reset it before calls to
        ; DOS functions that use it as part of a pointer (such as
        ; 9, to print a string, used in the TypeStr macro).
        ; FindFreeMem returns with the carry flag set if it finds
        ; us already installed.

CheckMem:
                CALL    FindFreeMem     ; generic header checker
                JNC     CheckSpace

        ; Already installed.  Display message and terminate
        ; process with a return value of 1.

AlreadyInstalled:
                CStoDS                  ; restore DS to this segment
                TypeStr 'Already installed.'
                TermProc 1

        ; Check to see if there is enough free memory to
        ; install the buffer and header.

CheckSpace:
                MOV     AX,LastFree
                MOV     DX,DS
                SUB     AX,DX           ; number of paragraphs free
                JC      NoSpace         ; first free memory paragraph is
                                        ; after end of scratchpad
                MOV     CL,4            ; convert available paragraphs
```

→

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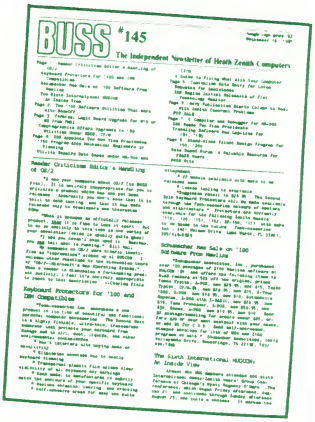
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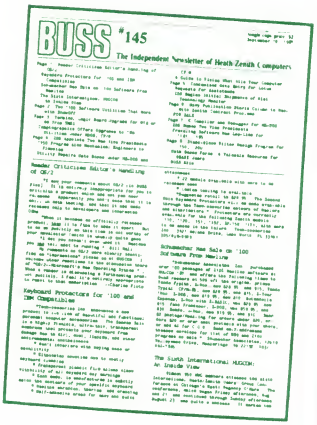
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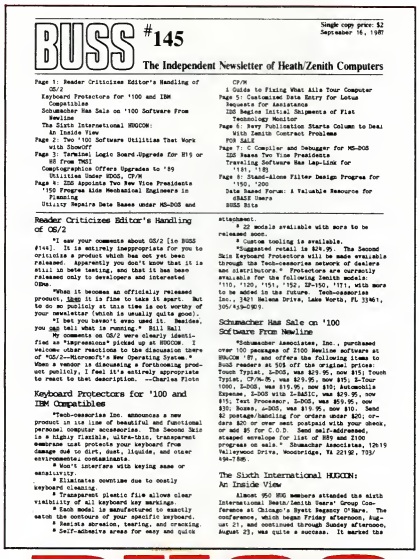

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Reader Criticizes Editor's Handling of OS/2

"I saw your comments about OS/2 [in BUSS #144]. It is entirely inappropriate for you to criticize a product which has not yet been released. Apparently you don't know that it is still in beta testing, and that it has been released only to developers and interested OEMs.

"When it becomes an officially released product, then it is fine to take it apart. But to do so publicly at this time is not worthy of your newsletter [which is usually quite good].

"I bet you haven't even used it. Besides, you had half what is running." Bill Hall

My comments on OS/2 were clearly identified as "impressions" picked up at HUGCON. I welcome other reactions to the discussion there of "OS/2—Microsoft's New Operating System." When a vendor is discussing a forthcoming product publicly, I feel it's entirely appropriate to react to that description. —Charles Florin

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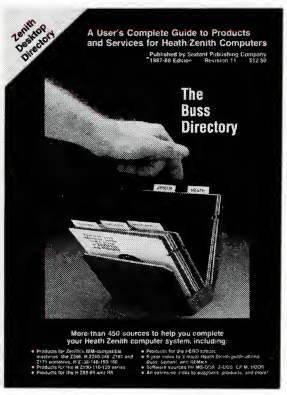

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After the equates comes a section of assembler macros. They just make life easier by taking a frequently used block of code and putting it in one place; it can then be called as needed, rather than be repeated.

(The DispStr and TypeStr macros are from the book *MS-DOS Developer's Guide* by John Angermeyer and Kevin Jaeger, published by Howard W. Sams & Co., Indianapolis, 1986. This is a very good book for anyone interested in a detailed look at some of the inner workings of MS-DOS.)

After the macros is a section with some segment definitions. The segment definitions supply the assembler with certain information about memory locations referred to by the installation portion. They are also handy to remind the programmer of that same information.

MonSeg refers to the location of variables used by the ROM BIOS (and kept in the scratchpad area). BiosSeg refers to locations in low memory that are also used by the BIOS.

The last segment definition is the real program segment, called Only. The ASSUME statements tell the assembler which segment registers to use to access variables in a given segment. Based on its knowledge of the contents of the segment registers, the assembler can decide which instructions to generate when certain references to data are made in the program.

Because KEYBBUFR will be assembled into a .COM file, it will execute entirely in one 64K segment. Therefore, the CS, DS, and ES registers will be loaded with the value of the Only segment when the program is loaded. Also, since this will be a COM program, it will originate at 100h.

Next comes the declaration of the FAR PROCedure KeyBuf. The first executable statement in the program is simply a jump to the installation part and *past* the part that will become memory resident.

```
                SHL     AX,CL           ;    to bytes
                SUB     AX,BufEnd       ; check for room
                JNC     AllOK           ; there is sufficient memory

        ; Not enough memory to install the buffer.  Display
        ; message and terminate process with a return value of 2.

NoSpace:
                CStoDS                  ; restore DS to this segment
                TypeStr 'Insufficient memory.'
                TermProc 2

        ; Everything seems OK, so put pointer to next free
        ; memory area into the header, copy the header to
        ; the free memory, and change the BIOS pointers.
        ; Create a pointer to the next paragraph of free memory
        ; by rounding the size of the header and buffer to the
        ; nearest paragraph size then adding it to DS, which
        ; contains the paragraph of the start of the memory
        ; area to be reserved.

AllOK:
                MOV     AX,DS
                ADD     AX,(BufEnd + 15) SHR 4
                MOV     CS:FreePtr, AX

        ; Now move the header to the scratchpad area.  Point DS:SI
        ; to local version of header, point ES:DI to scratchpad,
        ; then transfer.

                MOV     DX,DS
                PUSH    ES
                POP     DS
                MOV     ES,DX
                MOV     SI,OFFSET Header
                XOR     DI,DI
                MOV     CX,HeaderLen
                REP     MOVSB

        ; Now reset the pointers to the keyboard buffer.  It is
        ; assumed that ES still holds a pointer to the segment
        ; of scratchpad memory being set aside as the key buffer.

SetPtrs:
                MOV     AX,MonSeg       ; point to monitor segment
                MOV     DS,AX

        ASSUME DS:MonSeg

                MOV     WORD PTR DS:KeyBuffSegment,ES   ; set buffer segment
                MOV     WORD PTR DS:KeyBuffStart,BufStart; set start of buffer
                MOV     WORD PTR DS:KeyBuffEnd,BufEnd   ; set end of buffer

                MOV     AX,BiosSeg      ; point to BIOS data segment
                MOV     DS,AX

        ASSUME DS:BiosSeg

                MOV     WORD PTR DS:KeyHeadPtr,BufStart ; set buffer head ptr
                MOV     WORD PTR DS:KeyTailPtr,BufStart ; set buffer tail ptr

        ; Say that install was OK and terminate process
        ; with a return value of 0.

GoodEnd:
                CStoDS                  ; restore DS to this segment
                TypeStr 'Installed'
                TermProc 0

KeyBuf          ENDP

INCLUDE         FINDFREE.ASM

Only            ENDS

                END     CodeStart
```

The memory-resident portion

The only memory-resident part of the program is the header discussed above. And it is a rather simple header at that. It consists of the signature word, a string containing the program name, a word to hold the pointer to the next free memory location, and an interrupt list with one entry. Because no interrupts will be intercepted by this program, the only entry in the interrupt list is a single byte, 00.

Because the installation part of the program will determine where the program will be loaded, the source code does not specify a value for the word at FreePtr. The additional equates following the header will aid in installation.

That is all there is to the memory-resident part of the program. In the source code, we do not even need to reserve any space for the buffer. That space will be reserved when the installation portion of the program fills in the word at FreePtr and sets the various BIOS pointers.

Install the buffer

The real working part of KEYBBUFR begins at Install. When KEYBBUFR executes, it first prints a sign-on message giving its name, purpose, and version.

Next, the program checks the version of MS-DOS being run. KEYBBUFR makes use of features that are present only in version 2 or later. If the program detects that it is running on an earlier version, it displays an error message and exits.

If the version of MS-DOS is satisfacto-

ry, the program calls FindFreeMem (Listing 2). If the subroutine returns with an indication that a copy of the program is already installed, the program displays an error message and exits. There is no sense in installing a duplicate keyboard buffer, since you would just "orphan" the memory used by the first buffer.

If the program has not been installed previously, the installation code checks to determine if there is sufficient free memory in the scratchpad RAM to hold the buffer and header. It does so by first checking to see if the address of the first free memory paragraph (contained in the DS register at this point) is beyond the end of the available RAM. If not, a check is made to see if there are enough free bytes to hold both the buffer and the memory-resident part of the program. If there is not enough free memory, then (you guessed it) an error message is displayed and the program exits.

If execution of the program reaches this point, it is just about home free. The environment is acceptable for running the scratchpad program.

All that remains is to set FreePtr, move the header to the correct location in scratchpad RAM, and reset all of the BIOS pointers. That is exactly what the next part of the program does. The previously defined equate BufEnd is used to set FreePtr by rounding up to the nearest memory paragraph; the value obtained is then added to the starting location of the memory-resident part of the program (contained in the DS register).

Notice that the process of resetting the pointers also effectively clears the type-ahead buffer. It happens by setting the head and tail pointers to the same value. That means we will lose any characters typed after the command line that invokes KEYBBUFR, but before the program reaches the point of resetting the pointers. This happens quickly enough so that it is very unlikely we'll lose any characters; in any case, though, the keyboard buffer is now in a new location and contains no characters.

At this point, the program has successfully installed the new buffer, and displays a message to that effect before exiting. There will be no difference in the way the computer behaves, except that a lot more characters may be entered faster than they are accepted.

```
;
; FindFreeMem -- find the first available free memory in the unused
; scratchpad area.  Return with the carry flag reset and DS
; containing the paragraph of the available memory.  If the carry
; flag is set on return, a header with a signature string matching
; our own was found.  DS will contain the paragraph of the matching
; header.
;
; This routine expects the values of FirstFree, SigWord, SigString,
; SigStringOffset, FreePtrOffset and SigLength to be defined in the
; module that INCLUDEs this one.
;

FindFreeMem     PROC    NEAR

                MOV     AX,FirstFree    ; DS:BX -> first free memory paragraph
                MOV     DS,AX
                XOR     BX,BX           ; clear BX
                CLD                     ; auto increment pointers

FindFree1:      MOV     AX,SigWord      ; copy of signature word
                CMP     AX,WORD PTR [BX]        ; look for signature word
                JZ      CheckString     ; if there, jump to check string
                CLC                     ; not here, so clear carry
                RET                     ; and return

CheckString:    MOV     DI,OFFSET SigString     ; check signature string
                MOV     SI,SigStringOffset      ; offset in header
                MOV     CX,SigLength    ; length of signature string
                REPE    CMPSB
                JNE     NoMatch         ; no match
                STC                     ; match, already here, so set carry
                RET                     ; and return

    NoMatch:    MOV     AX, WORD PTR [BX]+FreePtrOffset ; get pointer to next free
                MOV     DS,AX
                JMP     SHORT FindFree1

FindFreeMem     ENDP
```

Listing 2. FINDFREE.ASM provides the FindFreeMem procedure that determines where in scratchpad RAM KEYBBUFR (Listing 1) can place the keyboard buffer. FINDFREE will be INCLUDEd in the KEYBBUFR program during assembly.

```
Point to the first possible free memory paragraph.
LOOP
   IF the first word is not the signature word THEN BEGIN
      Clear the carry flag.
      Return with DS register containing free paragraph.
   END
   ELSE BEGIN
      IF the signature string matches our own THEN BEGIN
         Set the carry flag.
         Return with DS register containing the paragraph
            of the matching program.
      END
      ELSE BEGIN
 Get pointer to paragraph after this program.
 Continue the search at the beginning of the loop.
      END
   END
ENDLOOP
```

Listing 3. A "pseudo-code" description of the operation of the FindFreeMem procedure given in Listing 2.

An essential part of installation is finding out exactly where to install the new buffer.

Assembly and operation

The steps involved in assembling the program are easy. At the MS-DOS command line, the steps are:

```
MASM KEYBBUFR
LINK KEYBBUFR
EXE2BIN KEYBBUFR KEYBBUFR.COM
```

The program will assemble with MASM version 1.27 (very slow; included with the MS-DOS Version 2 Programmer's Utility Pack), version 3 (slow; previously included with the MS-DOS Version 3 PUP) or version 4 (fastest; included in recent PUP shipments). Ignore the linker's warning about the stack segment. There isn't supposed to be a stack segment in a .COM file.

To install the enlarged keyboard buffer, just type KEYBBUFR at the MS-DOS system prompt. KEYBBUFR may be invoked at any time. Since it does not intercept any interrupts, its installation doesn't interfere with any "conventional" memory-resident programs. You can change the size of the buffer by just changing the KeysToBuffer equate and reassembling the program.

Note that changing the keyboard buffer works with most applications. However,

Listing 4. PRNHDR.C source code (written for version 2 of the Datalight C compiler). If programs have been stored in scratchpad RAM and marked by a signature word (as described in the text), PRNHDR will report their presence and indicate any interrupts they are designed to intercept. A sample PRNHDR report is given in Listing 5.

```
/*
**  prnhdr -- display the chain of scratchpad program headers that
**  are currently installed in memory.
**
**  Compiled with Datalight C ver. 2.0.  Must be compiled with the
**  -a option to override the default alignment of structure
**  members on word boundaries.  The program must be compiled with
**  one of the flags -md or -ml in order to use long pointers to
**  the scratchpad memory area.
**
**  Also note that the structure of the interrupt list record is
**  given but not actually used.  This is because structures are
**  always aligned on word boundaries, but successive elements in
**  the list will not be on word boundaries since the interrupt
**  list elements are 5 bytes long.
**
**  Version 1.0
**
**  David D. Clark
**  2 February 1987
*/

#include        <stdio.h>

#define         FIRSTFREE       0xf0400 /* first free area in scratchpad */
#define         LASTFREE        0xf4000 /* first address after scratchpad */
#define         SIGNATURE       0xd6c9  /* program header signature */
#define         SIGLENGTH       8       /* length of header signature string */
#define         PARALENGTH      16      /* length of memory paragraph */

/*
**  This is the structure of an interrupt list member.  It
**  is not actually used in the program since all structures
**  are allocated on word boundaries.  In the scratchpad
**  programs, the elements of the interrupt list are
**  allocated on byte boundaries.
*/

typedef struct intrecord {
        char intnumber;
        unsigned short intoffset;
        unsigned short intsegment;
} INTRECORD;

/*
**  This is the structure of the header for a scratchpad
**  program.  In the program, the pointer to the interrupt
**  list, "firstintr", is cast to a character pointer and
**  used as such.
*/

typedef struct header {
        unsigned short sigword;
        char sigstr[SIGLENGTH];
        unsigned short next;
        INTRECORD firstintr;
} HEADER;

main()
{
HEADER *hp;                     /* used as a pointer to each header */
int i;                          /* counter */
char *sp;                       /* used as a pointer to signature strings */
char *ip;                       /* used as a pointer to INTRECORDs */
unsigned short *vp;             /* used as a pointer to seg and ofs */

        hp = (HEADER *) FIRSTFREE;      /* point to the first location */

        /* while we find program headers in a chain */
        while (hp->sigword == SIGNATURE)
        {
                /* display the information in the header */

                printf("Header signature found at 0x%05lx.\n", (long) hp);

                printf("  The application name is: ");
                for (i = 0, sp = hp->sigstr; i < SIGLENGTH; i++, sp++)
                        putchar(*sp);
                puts(".");

                printf("  It occupies 0x%04lx bytes of memory.\n",
                        (long) PARALENGTH * (long) hp->next - (long) hp);
```

➔

```
                /*
                **  This messy "for" statement is due to the way
                **  structures are stored.  As mentioned above,
                **  structures are stored on word boundaries.
                **  We use a character pointer to get at the
                **  interrupt list elements stored on byte
                **  boundaries.
                */

                if ((char *) &(hp->firstintr))
                        printf("  Interrupts preempted are:\n");
                for (ip = (char *) &(hp->firstintr); *ip != '\0'; )
                {
                        printf("    Interrupt 0x%02x\n", *ip);

                        /* point to offset */
                        vp = (unsigned short *) ++ip;
                        printf("      Original offset  = 0x%04x.\n", *vp);

                        /* point to segment */
                        vp = (unsigned short *) (ip += 2);
                        printf("      Original segment = 0x%04x.\n", *vp);

                        /* point to next interrupt number */
                        ip += 2;
                }

                putchar('\n');

                /* point to next header in the chain */
                hp = (HEADER *) ((long) PARALENGTH * (long) hp->next);
        }

        printf("No signature found at 0x%05lx.\n\n", (long) hp);

        printf("0x%05lx (%ld) bytes of memory free.\n",
                LASTFREE - (long) hp, LASTFREE - (long) hp);

        exit(0);
}
```

```
Header signature found at 0xf04d0.
  The application name is: KEYBBUFR.
  It occupies 0x00e0 bytes of memory.

Header signature found at 0xf04e0.
  The application name is: KEYBREAK.
  It occupies 0x0040 bytes of memory.
  Interrupts preempted are:
    Interrupt 0x09
      Original offset  = 0xbe48.
      Original segment = 0xf000.

Header signature found at 0xf0520.
  The application name is: SCRNSAVE.
  It occupies 0x08f0 bytes of memory.
  Interrupts preempted are:
    Interrupt 0x09
      Original offset  = 0x0012.
      Original segment = 0xf04e.
  Interrupts preempted are:
    Interrupt 0x10
      Original offset  = 0x8d74.
      Original segment = 0xf000.
  Interrupts preempted are:
    Interrupt 0x1c
      Original offset  = 0xe922.
      Original segment = 0xf000.

Header signature found at 0xf0e10.
  The application name is: COLRCLOK.
  It occupies 0x0170 bytes of memory.
  Interrupts preempted are:
    Interrupt 0x1c
      Original offset  = 0x07f8.
      Original segment = 0xf052.

No signature found at 0xf0f80.

0x03080 bytes of memory free.
```

Listing 5. Output from a sample run of the PRNHDR program (Listing 4). In this case, PRNHDR reports the presence of some of the scratchpad-RAM programs the author has created, and gives the interrupts they are designed to intercept. (The first program, KEYBBUFR, given in Listing 1, is not designed to intercept any interrupts.)

some programs that stuff characters directly into the buffer may fail if they make assumptions about the location of the buffer.

Examining the headers of installed programs

It can be pretty hard to tell if programs such as KEYBBUFR are actually "alive." The C program in Listing 4, PRNHDR, will examine the scratchpad memory area and print the contents of the chain of installed program headers. (PRNHDR.C is written for use under version 2 of the Datalight C compiler.)

Listing 5 is a sample of the output produced by the PRNHDR program. It tells you where programs are, what they are named, the interrupts they will intercept, and where the next program should be located.

(Even though C is a relatively "low-level" high-level language, look at all the trouble it is just to print out the contents of memory. Turbo Pascal might do it more easily, but I did not have the gumption to try it.)

The source and executable files for all of the programs listed in this article and in its sequel are available on a double-sided/double-density 5¼" MS-DOS floppy disk. Also included on the disk are source and executable files for a screen-saver program and an on-screen clock program. The disk may be obtained by sending a check or money order for $25 to the author, at the address below.

Next time

In the next installment, we will look at what is involved in writing programs that will *execute* in the scratchpad memory. We will develop a short program to create a "hot key" to invoke the ROM monitor at any time from the keyboard. Besides being instructive, the program is very useful. Other topics that will be discussed include code relocation and a little on interrupt handling.

Ordering Information

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TM-150, $25.
MS-DOS Version 3 Programmer's
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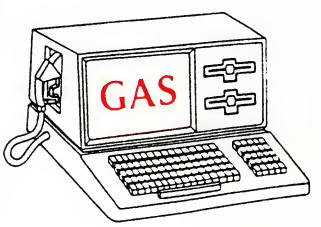

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Fully compatible with HS-317, supports all boot commands, boot directly from Hard Disk without seeking drive A. Extremely fast transfer! Up to 100% faster than ZW-248 and 500% faster than ZW-158.

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Core® Test Comparison Chart

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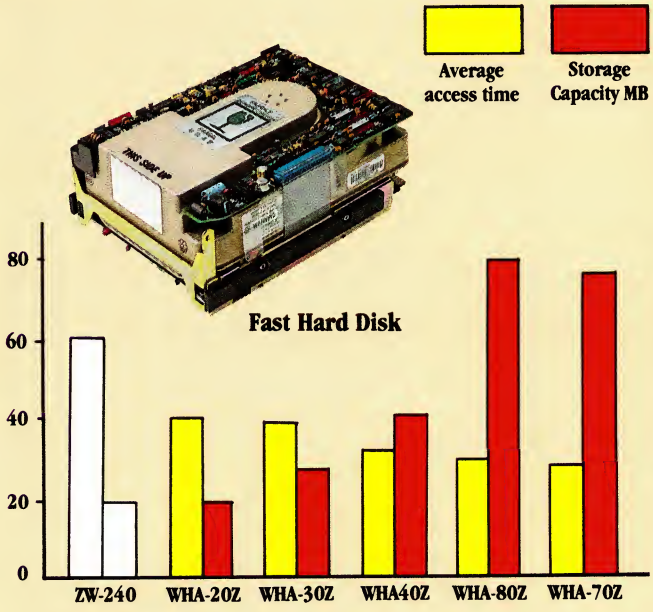
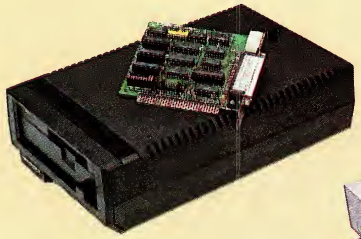


Storage capacity and access time comparison chart

TAPE DRIVE FOR H/Z 140, 150, and 160

Backup 20MB in 4 minutes, extremely reliable backup operation. Internal or External Drives, user friendly software, Image/file-by-file. Works with Novell and Xenix.



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20MB Internal	$589.00
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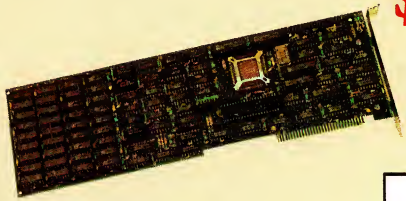

CPU Performance Comparison Chart ★ Software Wizardry

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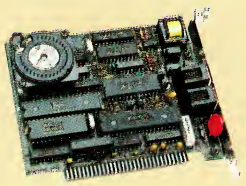

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- ★ Half size
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- ★ BitCom communication software
- ★ Emulates VT-100, IBM 3101, VT-52
- ★ User definable
- ★ Powerful script commands
- ★ Stores up to 32K numbers with different communication parameters
- ★ Reliable even on noisy lines.

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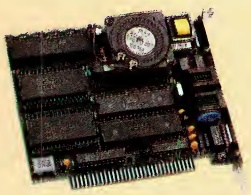

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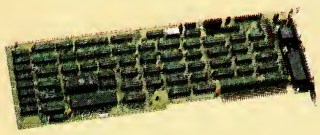
Excellent for long distance call
FCC class 'B' approved

EVERCOM 1200/2400

- ★ Half size,
- ★ Configurable to COM 1 to COM 4
- ★ Fully Hayes compatible
- ★ BitCom communication software
- ★ Emulates VT-100, IBM 3101, VT-52
- ★ User definable
- ★ Powerful script commands
- ★ Stores up to 32K numbers with different communication parameters
- ★ Reliable even on noisy lines.



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- ★ Hercules 720 x 348 Monochrome graphics/64K
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- ★ Expandable to EGA

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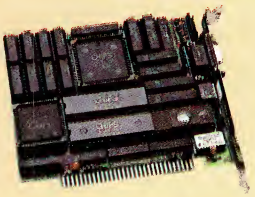
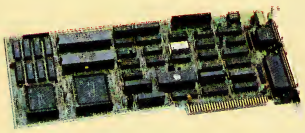


MICRO ENHANCER

- ★ 640 x 350/16 colors from a pallette of 64
- ★ 256K RAM
- ★ Short card—5" long
- ★ W.P./color
- ★ Lotus 1-2-3, Acad, and M.S. window
- ★ Works with all 3 different monitors (EGA monitor is required to take full advantage of the EGA Mode.)

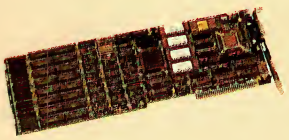
$229



ENHANCER

- ★ 640 x 350/16 colors from a pallette of 64
- ★ 256K RAM
- ★ W.P./ color
- ★ Lotus 1-2-3, Acad, and window
- ★ Works with all 3 different monitors (EGA monitor is required to take full advantage of the EGA Mode.)
- ★ 2/3 size
- ★ With 1 parallel port—configurable as LPT 1-LPT 3

$239



EPGA

- ★ Fully PGA compatible
- ★ 640 x 480/256 colors out of pallette of 4096
- ★ Emulates, HGA & CGA concurrently operating on one monitor
- ★ 8 MHz 80286/512K RAM/TI Graphics controller to perform 2D and 3D graphics commands. For example: lines, viewing transformations, and more at a very high speed.
- ★ For CAD engineering, Scientific and Educational (PGA monitor required)

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RAM Board, ϕK $179

RAM Chips (installed) 1/2MB 150ns **$56.50**
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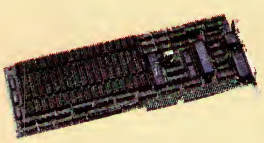
RAM 3000

- ★ Add up to 3MB of extended memory on 1 board, 5MB with piggy back RAM for Z-200/248
- ★ High speed, up to 12 MHz operation
- ★ Compatible with Novell, MS DOS 5.0, Xenix, and RAM disk for MS DOS 3.1
- ★ Free software

RAM Chips (installed) 1/2MB 100ns **CALL**



With ϕK $195

MAGIC 16

(Multifunction Card for Z-200)

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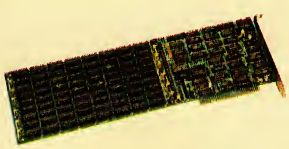
- ★ 1 parallel, 1 serial port, optional 2nd serial
- ★ Free software



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- ★ For RAM disk
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- ★ Run Lotus 1-2-3, MS Window and more
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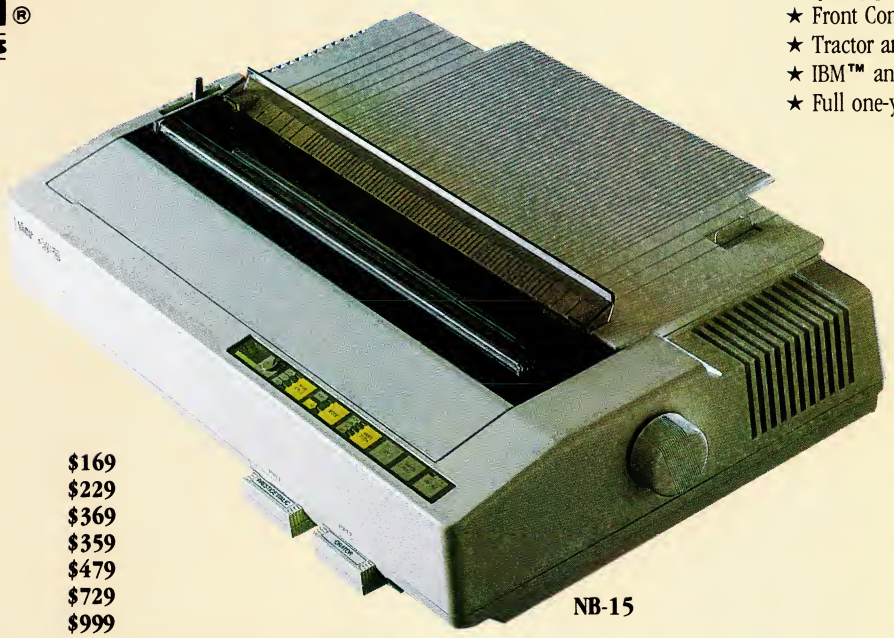

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100 cps NP-10	**$169**
120 cps NX-10	**$229**
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180 cps ND-15	**$479**
216 cps NB-2415 (24 pin)	**$729**
200 NB-15 (24 pin)	**$999**

MAGNAVOX TTL-MONOCHROME

- ★ Nonglare Amber or Green
- ★ 12" screen
- ★ 1000 lines of resolution
- ★ FCC class 'B' approved

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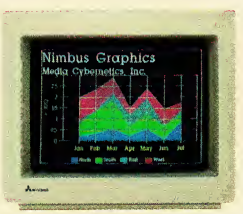
Amber or Green



MITSHIBISHI 1410 14" EGA MONITOR

- ★ 640 x 350 EGA
- ★ 640 x 200 CGA
- ★ FCC class 'B' approved
- ★ Auto contrast

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We also carry a full-line of Mitsubishi and Sony monitors. Please call for more information.

TEKNIKA M3-503 13" MULTI-STANDARD MONITOR

- ★ 926 x 580 Super High Res.
- ★ CGA/EGA/PGA/ANALOG
- ★ 16/64/4096 colors
- ★ Works with Z-100, Z-100 PCs, Z-200, and Z-386
- ★ Perfect match for EPGA and Micro Enhancer Deluxe

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M2 MOUSE

- ★ No slot needed, work through SIO
- ★ Removable Nylon Ball gives positive response
- ★ Works with all major software supporting a mouse
- ★ A must for Lotus, MS window and Acad

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Circle #227 on Reader Service Card

Supplier Notes

A Program That Simulates Logical Processes

Now you can actually see how logical devices work. BV Engineering has released a menu-driven digital logic simulation program for the IBM PC and compatibles. Given a description of a logic circuit and a sequence of binary input signals, LSP computes the resulting binary output signals at any or all nodes of the circuit at the specified times.

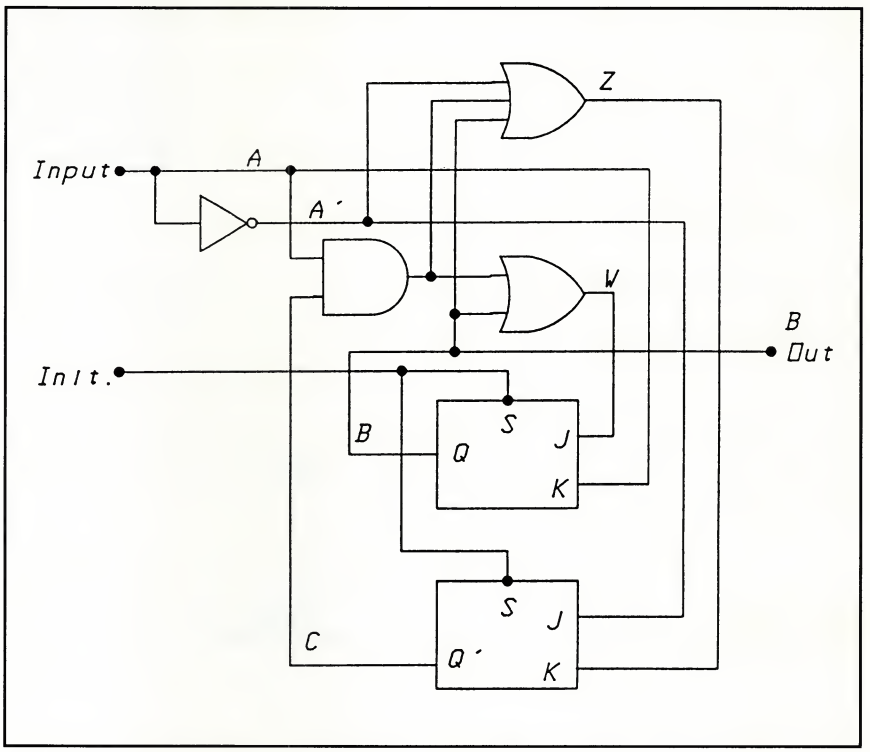
LSP then produces a timing diagram, showing the binary states of each selected signal as a function of time. Both input and output data can be saved to data files for future use.

LSP contains built-in models for combinatorial devices such as AND, OR, NAND gates, etc., and sequential devices such as D, JK, and toggle flip-flops, as well as tri-state devices. Signals, inputs, and output nodes may be defined by common and easily remembered names. Each signal can be assigned a delay time ranging from 1 to 255 user-defined time units. LSP handles all time scheduling, and accurately propagates the input and computed output results through the design, regardless of the complexity or nesting of feedback loops.

LSP provides for zero (0), one (1), don't know (X), and high-impedance (Z) states. Each state is properly propagated through the circuit. Multiple data-file input is allowed, supporting the concepts of structured/partitioned designs and tests.

Both periodic and aperiodic input signals can be specified. Both types of input may be mixed in a single design, simplifying input data entry. Signals can be edited with the built-in input-signal editor.

LSP provides for full output control, including periodic sampling, single-step, breakpoint interrupt, and signal-change interrupt (useful for "glitch" detection). (You can specify outputs initially, as well as inputs.)



BV Engineering's LSP program simulates digital logic circuits.

LSP is menu-driven and interactive. ASCII input files may be created from within LSP, or you can use your own editor or software written in BASIC, Pascal, etc.

When used with BV Engineering's PC-PLOT and/or PDP, LSP allows you to do full-screen, printer, and plotter graphics.

LSP supports keystroke macros of unlimited length. Auto-execute and batch modes allow you to execute and operate LSP unattended, from a file instead of from the keyboard.

Retail price for LSP is $95. The package is available for IBM-PC compatibles under MS-DOS 2 or higher; a version is also available for the Apple Macintosh.

Contact BV Engineering, 2200 Business Way, Suite #207, Riverside, CA 92501; 714/781-0252.

The Z286—IBM-PC-AT Compatibility at an Affordable Price

Built around an Intel 80286 central processing unit, Zenith Data Systems' new IBM-PC-AT-compatible computer, the Z286, may not quite match the performance of its cousin, the '248. But the machine will at least give users compatibility at an affordable price.

The '286 features compact styling, an AT/XT bus, a choice of 3½" or 5¼" disk drives, 640-by-480-pixel resolution, and an enhanced 101-key keyboard—all for under $3,000. The machine comes standard with 512 kilobytes of random-access memory (RAM), and is expandable to about 15 megabytes. Also included are one parallel and one serial port, four open expansion slots, and a real-time clock and calendar.

Improved video is a noticeable characteristic of the '286. All popular video modes are supported through the Z449 video card. The card enables software to work equally well on new digital and analog monitors, and older RGB and TTL monitors.

Zenith plans to market three configurations of the '286: Model 3, with two 3½" floppy drives, for $2,399; Model 23, with one 3½" 1.44-MB floppy drive, a 20-MB hard-disk drive, and Microsoft Windows, for $2,999; and Model 25, similar to Model 23, but with a 5¼" 1.2-MB floppy drive, also for $2,999.

Even though its memory capability is greater than that of some other AT-compatible machines, the '286 is still 24% smaller than the '248. The '286 weighs about 40 pounds, and measures 16" wide x 6¼" high x 16½" deep.

To round out the package, Zenith is shipping version 3.21 of the Microsoft Disk Operating System (MS-DOS) with all machines. This has disk caching for hard and floppy drives. The advantage of disk caching is that it improves disk access speed—50% with a hard drive, 500% with a floppy drive. A further advantage of MS-DOS 3.21 is its support of 3½",

1.44-MB floppy drives.

In addition to these advantages, the '286, like the '248 and the '386, is capable of running Microsoft's new Operating System/2 (OS/2). The 3½" disk-drive option may interest some users who'd like the ability to swap disks between the '286 and a laptop. So, even though it may not perform as outstandingly as the '248, Zenith's new Z286 nonetheless gives users IBM-PC-AT compatibility in a smaller, less expensive package.

Contact Zenith Data Systems, 1000 Milwaukee Avenue, Glenview, IL 60025; 800/842-9000, ext. 1.

DON'T MISS OUT!

Circle #249 on the Reader Service Card between pages 46 and 47 to participate in a survey of Heath/ Zenith IBM-PC compatible users. We need your input.

The Z286 offers a choice of 3½" or 5¼" disk drives.

Classified Ads

Information

PERSONAL COMPUTER OWNERS can earn $1,000 to $5,000 monthly, selling simple services performed by their computer. Work at home—in spare time. Get free list of 100 best services to offer. Write: A.I.M.F.V., P.O. Box 60369, San Diego, CA 92106-8369.

Software

EXCLUSIVE SOFTWARE RIGHTS for simulation game software: Vega-Bound I/II, USS Fast Attack, and Jim's War are for sale. Games currently run on Z100 only. IBM PC, Apple Mac, Commodore Amiga, etc., are untapped, and represent huge potential. No other games like these are available from anyone. (See reviews in *REMark*.) Author leaving game software business, and wants good development home for programs. Suggest learning source code (compiled Z-BASIC) on Z100. (My system is available—package deal?) Microsoft Quick BASIC would be ideal conversion tool. Best serious offer. Jim Illman, 206/365-1542 (Seattle).

Hardware

H89A with 256K D-G Super-89, dual 80-track DD/DS, dual external HS/SD drives. Also, all original boards, technical manuals, and lots of software. $400 cash takes all! Pat Decano, 206/882-2626, 206/882-3061.

Z100, 8087, 10-MB HD, 768K, 8-MHz, some software; $1,000. Steve Ellstrom, 199 Buckwood Drive, Hyannis, MA 02601, 617/778-1430.

Z89, 64K, like new, used very little, software included. Over $2,000 invested. $275 all. 717/584-4644.

Z100, Clarkson model, 768K, full color/RGB memory, two 5¼" drives, UCI board, mouse, speed-up chip. All manuals, software, and Epson LX-80 printer. $2,100 or best offer. 518/891-2670; 518/891-2063 nights.

H/Z100 all-in-one, 8-MHz, 512K on motherboard, two 5¼", two 8" DS/DD drives, manuals, software. $1,200. Stephen Dydo, 718/636-2109.

Z100 low-profile, 11-MB hard disk, speed chip, 768K memory, monitor, and much software. Also, Z29 smart terminal. Best offer. Joe Noth, 312/638-4880.

Z100 low-profile, 768K, full video RAM, green monitor, two 360K drives, 2400-baud modem with cables, lots of software. $795, negotiable. Paul, 607/336-7921 nights.

H/Z100 low-profile, 768K, RGB color monitor, dual 5¼" drives, dual 8" drives, spare 5¼" drive. Technical manuals and software. $950. 408/238-9051.

H19 and H37 drives. Write: Bill Shumate, 4112 Stutz Court, Tucker, GA 30084.

How to Order a Classified Ad

To get in touch with your fellow Heath/Zenith users, place your short notice in *Sextant*'s classified section. The rate is 75¢ per word, with a minimum of 15 words.

Please omit all *specific* references to software, unless the package is unopened. If unopened, please specify.

Send your typewritten ad and payment to: Sextant, Classified Ad Department, 716 E Street S.E., Washington, DC 20003. Please include your name and phone number for our records.

Deadline is November 19 for the January-February 1988 issue, and January 14 for the March-April issue.

Coming Up in Sextant

- *Hard-disk management on the '248*
- *Some tips on writing computer games*
- *Another look at fractal images*
- *A review of the Scottie Board for the '100*
- *Speeding up the H8*
- *An MS-DOS program that lets you trace your family's roots*
- *A handy scroll utility for CP/M*
- *The ENABLE integrated package for MS-DOS*

Scuttlebutt

"We coulda been a contender" is a phrase not likely to be uttered from Zenith's lips. The company won a unanimous decision in the second round of bidding over three other computer companies, landing its fourth military contract in five years.

Under the **three-year, $104-million contract** with the Department of Defense, Zenith will supply about 90,000 Z180-series laptops. Primary purchasers will be the U.S. Navy, Air Force, Army, and Defense Logistics Agency.

Bundled with the '180, one of the **goodies** Zenith dropped in the DOD's $104-million lap is Enable, the integrated software package put out by The Software Group of Ballston Lake, New York. The program contains five modules: word processing, spreadsheet, data base management, graphics, and telecommunications. You can jump between modules with just the press of a key.

Because Enable has gained such attention at home, it should have little trouble winning popularity abroad. The package is now available in 23 countries in nine languages, including French, German, Swedish, Norwegian, Italian, Finnish, and Japanese (Kanji). Enable's **linguistic versatility** may help land it a special Nobel Prize for Promoting Unity in Worldwide Computer Applications.

From the **As-American-as-Sushi** Dep't.: Zenith, the only remaining "made-in-the-USA" television manufacturer, is commissioning Sanyo to build, in Japan, an undetermined but large quantity of the '180s going to the military. Despite the U.S. government's trade sanctions against Japan several months ago, the price of the military's machines will not be affected. The Air Force reportedly is indifferent about the machines being built in Japan, but was less apathetic about Toshiba's **illegal sale of milling machines** to the Soviet Union when deciding on its supplier. According to an article in *Electronic News*, the Air Force was ordered by DOD officials to start a second round of bidding to **avoid potential embarrassment** and possible illegality for giving the award to Toshiba, even though Toshiba was rumored to have bid lowest in the first round. Chalk up another one for truth, justice, and the American Way.

John P. Frank, one of the principal engineers of Zenith Data Systems' "niche" marketing strategy, has been appointed **president of Zenith Data Systems**. Frank succeeds Robert P. Dilworth, who had been at the helm for two years.

Having started as national sales manager, Frank **quickly rose through the ranks** as vice president of sales, vice president of marketing, and senior vice president of sales and marketing, to his current executive position.

And what about Dilworth? The former president hasn't abandoned the Zenith community. He'll act as consultant to ZDS as he takes command at Metricom, a new electronic metering venture in Cupertino, California. According to the announcement, Dilworth made the move "to return to his first love, a smaller, privately held company."

John P. Frank takes command as president of Zenith Data Systems.

"Billions fitted here." That sign may be appearing sooner than you think. An item in the August 20 "TechTalk" column of *USA Today* reported on the project of Dana Rogers, an electrical engineer at the University of Dayton. Rogers has created a program that will "read" a person's body measurements and convert them to a **personally tailored pattern**. Rogers plans to do some more work on the program using an optical scanner and his Z100, then give it to his daughter Beth. If all goes well, Beth would like to open a clothing store, paving the way for **McDresses and McSuits** everywhere.

ZDS reports that it has agreed to market Operating System/2 (OS/2), Microsoft's operating system for **80286- and 80386-based computers**. The operating system, currently in beta testing by Zenith, surpasses MS-DOS's 640K random-access memory limit to allow support of up to 16 megabytes.

Another improvement is the ability to process **multiple applications** concurrently. ZDS plans to ship OS/2 by late 1987, and will include Microsoft's Windows 2.0 or Presentation Manager.

"Arigatō (Thanks), Zenith," may become a common phrase in the halls of Tokyo-based C. Itoh & Company Limited. The world's largest trading company will distribute Zenith's flat tension mask color picture tube in the **Far East**, beginning in January.

The flat tension mask technology, which cost $50 million to produce, is expected to return many benefits for Zenith. The tube's **perfect flatness** frees images from geometric distortion, so that straight lines appear as straight lines. Otto Genutis, president of Zenith's Components Group, said that Japanese computer makers have so far been impressed by the **ergonomics** and performance of the display. Genutis also said that "the tube's high-resolution capabilities make it ideal for display of Oriental writing."

Are you listening, Zenith? According to Jocelyn Young, an analyst for McGraw Hill's Future Computing unit, vendors who focus on **service and support** can expect to increase their personal computer sales over the next five years. Young suggests, however, that customer loyalty has become a **key to survival**, and isn't merely a profit-making tool.

To capitalize on this trend, Young says, vendors must start paying more attention to repeat buyers, because they will represent the bulk of future business.

Young says that vendors who follow the seemingly simple practice of giving the customers what they want can expect to **stay afloat** as the computer market matures into the 1990s.

In the August 1987 issue of *REMark*, Jim Buszkiewicz reported that the national Heath/Zenith Users' Group Conference held in Chicago in August **would be the last**. The report was reiterated at the conference itself.

Yet, Jim also hinted at HUGCON that there was a **glimmer of a chance** that future national conferences might once again be held.

HUG's current plans are to make future HUGCONs regional and to have local Heath stores sponsor them.

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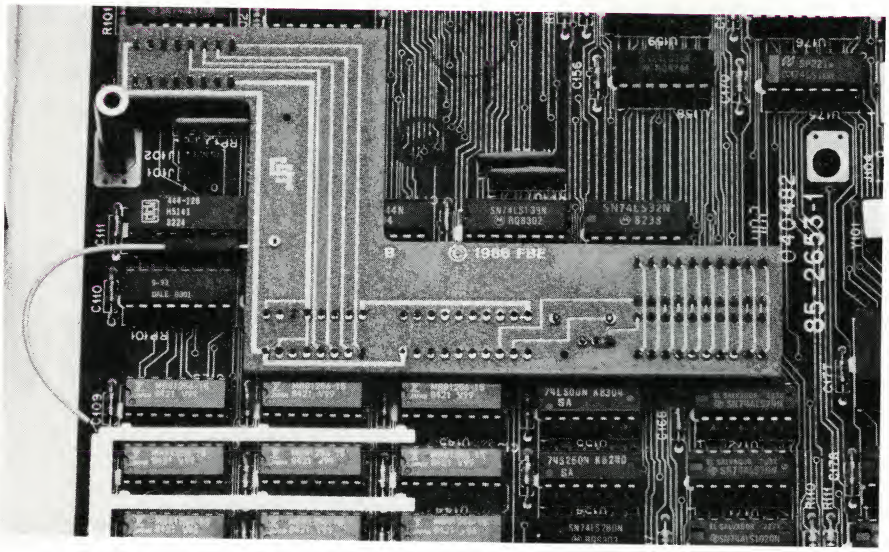

FBE ZMF100A

Maximize Your H/Z-100

Reader Service #142

Expand Old Motherboard RAM

Short of Memory? Our ZMF100a expands your "old" motherboard RAM to 768K using 256K memory chips. Easy, plug-in installation requires no soldering. Part numbers 181-4917 or less (board number 85-2653-1 only!). Memory chips not included. **ZMF100A $65.**

Idle Memory Card Put to Work

Left over Z-205 memory card? Modify the Z-205 to take 256K memory chips, giving you 256K of regular memory plus a 768K RAM disk using supplied software. Contact us for data sheet before ordering. Memory chips not included. Additional components may be required for certain Z-100 configurations. **ZRAM-205 $49.**

Clock Uses No Slot

Reader Service #169

Date and Time on Bootup

The FBE SmartWatch gives you on-line date and time without using an expansion card slot. Installs under the monitor/BIOS ROM. Ten year battery. Software included. Uses the Dallas Semiconductor DS1216E SmartWatch module. Works with H/Z-100, H/Z-138/148, H/Z-150/160 series, H/Z-158, and others. **FBE SmartWatch for Z-100 $46.95. All others $44.95**

Z-171 Memory Expansion

Reader Service #220

One MegaByte RAM for Z-171

Our MegaRAM-171 let's you install a megabyte of RAM in your Z-171 as 640K of main memory and a 384K RAM disk. Plug-in installation, no soldering. Includes circuit card, RAM disk software, and documentation. **MegaRAM-171 $89.95.**

H/Z-89 Corner

Reader Service #116

Two Port Parallel Interface

Connect parallel interface printer or other devices to the H/Z-89 with our H89PIP Parallel Interface card. One output port, one input/output port. Right or left side installation. Driver software included (specify disk format and printer). **H89PIP $50. Printer Cable $24.**

Electronic Disk/ Interface

Add 128K electronic disk plus powerful printer spooling capability by installing our Spooldisk 89 on the right side H/Z-89 bus. Contact us for detailed data sheet describing this uniquely useful product. **Spooldisk 89 $195.**

Add an Expansion Slot

Add an additional expansion slot to the right side bus with our Slot4 Bus Extender. **Slot4 $45.**

Give Your H/Z-150 a Boost

Reader Service #102

LIM Expanded Memory

Boost your main memory to 640K and add 512K of Lotus/Intel/Microsoft-standard emulated expanded memory with our LIM150 modification. Simple to install, requires no soldering. Works with the standard H/Z-150/160 memory card. Includes replacement memory decoder PAL, Expanded Memory Manager software, jumper cable, and documentation. Requires forty-five 256K RAM chips (not included). **LIM150 $49.95**

Beyond RAM Disks

Squeezing your RAM disk? Add a 512K RAM disk over and above your regular memory with our MegaRAM-150. Works with the standard H/Z-150/160 memory card. Easy installation requires no soldering. Includes replacement memory decoder PAL, RAM disk software, jumper cable, and documentation. Requires forty-five 256K RAM chips (not included) for maximum memory size. Smaller sizes possible by mixing 64K and 256K chips. **MegaRAM-150 (704K Main Memory) $49.95. MegaRAM-150 T (640K Main Memory for EGA Compatability) $49.95.**

Boost RAM on Existing Card

Our ZP640 PLUS replacement memory decoder PAL lets you replace two banks of 64K RAM chips on the standard H/Z-150/160 memory card with 256K RAM chips to increase the memory size to 640K or 704K. **ZP640 PLUS $19.95.**

Don't Give Up A Serial Port

Keep your second serial port when adding an internal modem or other serial device by changing COM2 into COM3. Our COM3 kit includes a replacement port decoder PAL, COM3 I/O driver software, and documentation. **COM3 $39.95.**

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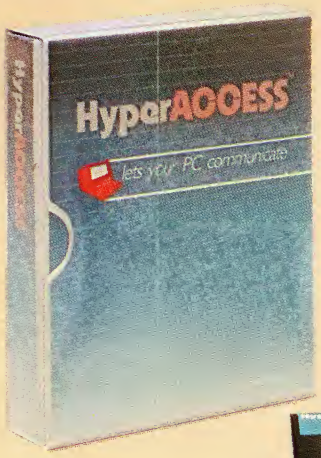

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